UNITED STATES AIR FORCE

GRIFFISS AIR FORCE BASE
NEW YORK

FINAL SAMPLING AND ANALYSIS PLAN

SITE ASSESSMENTS
AT
20 UNDERGROUND
STORAGE TANK SITES

OCTOBER 1993

11-2588-0203.02

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

October 5, 1993

Ms. Jean Schumacher
U.S. Army Corps of Engineers, Kansas City District
700 Federal Building
601 East 12th Street
Kansas City, MO 64106-2896

Subject: Submittal - Final Sampling and Analysis Plan for
Site Assessments at 20 UST Sites
Griffiss Air Force Base, Rome, New York
Contract No. DACA41-92-D-8001, D.O. No. 0003
Law Project No. 11-2588-0203

Dear Ms. Schumacher:

Enclosed please find four copies of the Final Sampling and Analysis Plan (SAP) for Site Assessments at 20 UST sites at Griffiss Air Force Base, Rome, New York, and our response to comments received on 9 September 1993 from the U.S. Army Corps of Engineers by telephone regarding the draft version of this document. No comments were received from Griffiss Air Force Base or the State of New York on this document. Additional copies of this submittal have been provided to the addresses on the attached Document Distribution Listing. This document is a deliverable required under the Federal Facility Agreement for Griffiss Air Force Base.

If you have any comments or questions, please do not hesitate to contact us. We can be reached by calling (404) 590-4600.

Sincerely,

Gary W. Seiler
Project Manager

Katy Allen for

Lee Ann Smith
Principal

GWS/KLA/tf

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FINAL
SAMPLING AND ANALYSIS PLAN FOR SITE ASSESSMENTS AT 20 UST SITES

GRIFFISS AIR FORCE BASE, ROME, NEW YORK

	COPIES
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Response to U.S. Army Corps of Engineers Comments
on 9 September 1993
Via Telephone Communication from Masud Zaman

This section addresses the following verbal comments received via telephone communication with Masud Zaman of the U.S. Army Corps of Engineers on 9 September 1993.

Comment 1: On page 2-4, Figure 2-2: indicate the meaning of the small, open circles.

Response: The open circles represent access ports to the oil/water separator. Figure 2-2 has been revised.

Comment 2: All of the figures indicate the "estimated direction of ground-water flow." Specify how the ground-water flow is determined.

Response: The anticipated direction of ground-water flow at the UST sites is based on a hydrogeology study performed by Chem Nuclear Geotech in 1990 and ground-water elevation measurements obtained during the Quarterly Monitoring Well Sampling being performed by Law Environmental, Inc. under contract DACA-41-92-8001, Delivery Order 1.

Comment 3: On page 2-11, Section 2.9, first bullet item: specify the nature of the petroleum hydrocarbon contamination.

Response: Previous ground-water analysis indicated benzene, toluene, xylene, and ethylbenzene contamination. The following levels were detected in one ground-water sample collected in 1991 (GAFB, 1991b): 1.6 mg/L of benzene, 42 mg/L of toluene, 31 mg/L of xylenes, and 4 mg/L of ethylbenzene.

Comment 4: On page 3-2, Section 3.3, third bullet item: clarify the strategy for sample collection and submission for analysis.

Response: Soil boring samples will be collected continuously for headspace screening. Based on the highest headspace readings, two field soil samples from each soil boring will be submitted to the laboratory for chemical analyses. One sample from each monitoring well boring will be sent for geotechnical analyses.

Comment 5: On page 3-2, Section 3.3, fourth bullet item: clarify the number of monitoring wells to be installed and the strategy for installation.

Response to U.S. Army Corps of Engineers (USACE) Comments
on 9 September 1993
Via Telephone Communication from Masud Zaman

Response: A total of four monitoring wells are planned during this investigation. Monitoring wells will be installed near the UST sites at Building 428, 745 and 846 (sites of known contamination), with a minimum of one well per site. These wells will be installed at locations anticipated to be hydraulically downgradient from the USTs. Additional wells may be installed based on evidence of visible contamination, headspace screening results, and chemical analyses of soil boring samples, if determined to be appropriate to characterize ground-water contaminants at these or other sites.

Comment 6: On page 3-2, Section 3.3, fifth bullet item: clarify the number of wells to be in-situ tested.

Response: In-situ permeability testing will be conducted on each monitoring well installed. Please refer to response to Comment 5 above for additional clarification.

Comment 7: On page 3-2, Section 3.3, sixth bullet item: indicate the number of samples to be collected from the monitoring wells.

Response: One round of monitoring well sampling is planned, with one ground-water sample to be collected from each monitoring well. Please refer to response to Comment 5 above for additional clarification.

Comment 8: On page 3-7, Section 3.4.2: specify the number of ground-water samples to be collected from the monitoring wells.

Response: Please refer to the response to Comment 7 above.

Comment 9: On page 3-9, Table 3-2, Field Investigation Task 2: clarify the number of soil boring samples to be collected from each soil boring.

Response: Two samples from each soil boring will be collected for chemical analysis.

Response to U.S. Army Corps of Engineers (USACE) Comments
on 9 September 1993
Via Telephone Communication from Masud Zaman

Comment 10: On page 3-9, Table 3-2, Field Investigation Task 3: clarify the number of samples to be collected for geotechnical analyses.

Response: One soil sample from each monitoring well boring will be collected for geotechnical analysis.

Comment 11: On page 3-9, Table 3-2, Field Investigation Task 4: clarify the number of ground-water samples to be collected.

Response: Please refer to the response to Comment 7 above.

LAW PROJECT No. 11-2588-0203.02 CONTRACT NO. DACA41-92-D-8001 No. 0003

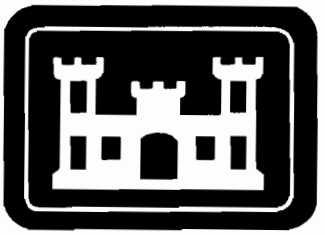
FINAL

SAMPLING AND ANALYSIS PLAN FOR SITE ASSESSMENTS AT UNDERGROUND STORAGE TANK SITES GRIFFISS AIR FORCE BASE, NEW YORK

FIELD OPERATIONS PLAN

Prepared For:

U.S. Army Corps of Engineers
Kansas City District
601 East 12th Street Kansas City, Missouri 64106



Prepared By:

Law Environmental, Inc., Government Services Division
114 TownPark Drive
Kennesaw, Georgia 30144

OCTOBER 1993

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PURPOSE OF DOCUMENT

Under the terms of the March 1992 Resolution of Disputes regarding the Federal Facility Agreement between the U.S. Air Force (USAF), Environmental Protection Agency, Region II (EPA), and the New York State Department of Environmental Conservation (NYSDEC), the USAF agreed to conduct site assessments at twenty underground storage tank (UST) sites. The sites are located at eighteen buildings at Griffiss Air Force Base, New York, where closures have been performed since December 22, 1988, and site assessments have not been conducted pursuant to 40 CFR 280.72. As part of this dispute resolution, the USAF also agreed to provide work plans for the proposed assessments for regulatory agency review and approval. This Sampling and Analysis Plan has been prepared as fulfillment of this requirement.

1.0 PROJECT OBJECTIVES

Under the terms of the Resolution of Disputes pertaining to the Federal Facility Agreement between the U.S. Air Force (USAF), the U.S. Environmental Protection Agency, Region II, (EPA) and the New York State Department of Environmental Conservation (NYSDEC), the USAF is required to conduct site assessments at twenty underground storage tank (UST) sites located at eighteen buildings at Griffiss Air Force Base (AFB), New York, to ensure that closures conducted at these sites are protective of human health and the environment. The site assessments are to be conducted pursuant to regulations at 40 CFR 280.72 and the May 15, 1991 NYSDEC memorandum on Spill Prevention Operations Technology Series (SPOTS), Number 14, Site Assessment at Bulk Storage Facilities. Under this agreement, the USAF agreed to prepare and provide copies of the work plans for the site assessment effort to the EPA and NYSDEC for review, comment and approval. This Sampling and Analysis Plan (SAP) consists of site-specific addenda to the Draft-Final Remedial Investigation (RI) Planning Documents dated July 1993 and has been prepared in a Field Operations Plan (FOP) format. This FOP describes the site-specific field investigation program for the 20 UST sites and should be used only in conjunction with the complete RI planning documents, including the Work Plan, the Quality Assurance Project Plan (QAPP), the Field Sampling Plan (FSP), and the Health and Safety Plan (HSP).

The project objectives for the site assessments at the twenty UST sites and the technical approach to the data gathering effort are described below. The purpose of this FOP is to provide and outline project activities associated with the site assessments to be conducted and to perform a quality-controlled sampling effort at twenty UST sites at the eighteen buildings listed below:

- Building 9
- Building 44
- Building 101
- Building 123
- Building 137
- Building 214
- Building 255
- Building 305
- Building 337
- Building 428
- Building 745
- Building 802
- Building 814
- Building 830
- Building 842
- Building 846
- Building 858
- Tank 6314

1.1 PROJECT OBJECTIVES

The objectives of the project for the UST sites are to perform a site assessment at each site in order to determine whether contamination from UST product releases is present, and if present, determine whether this contamination poses a threat to human health or the environment. These investigations will be conducted in accordance with the NYSDEC Spill Prevention Operations Technology Series (No. 14), (SPOTS), (NYSDEC, 1991) "Memorandum for Conducting Site Assessment at Bulk Storage Facilities."

1.2 DATA REQUIREMENTS AND TECHNICAL APPROACH

The data gathered during the investigations at the UST sites will be collected from soil boring advancement and sampling and from monitoring wells to be installed at the sites. The data required for this investigation consists of chemical data to evaluate the presence or absence of contaminants in the soil and ground water at the UST sites. These data will be acquired through the collection and laboratory analysis of representative samples for each matrix of concern at the site.

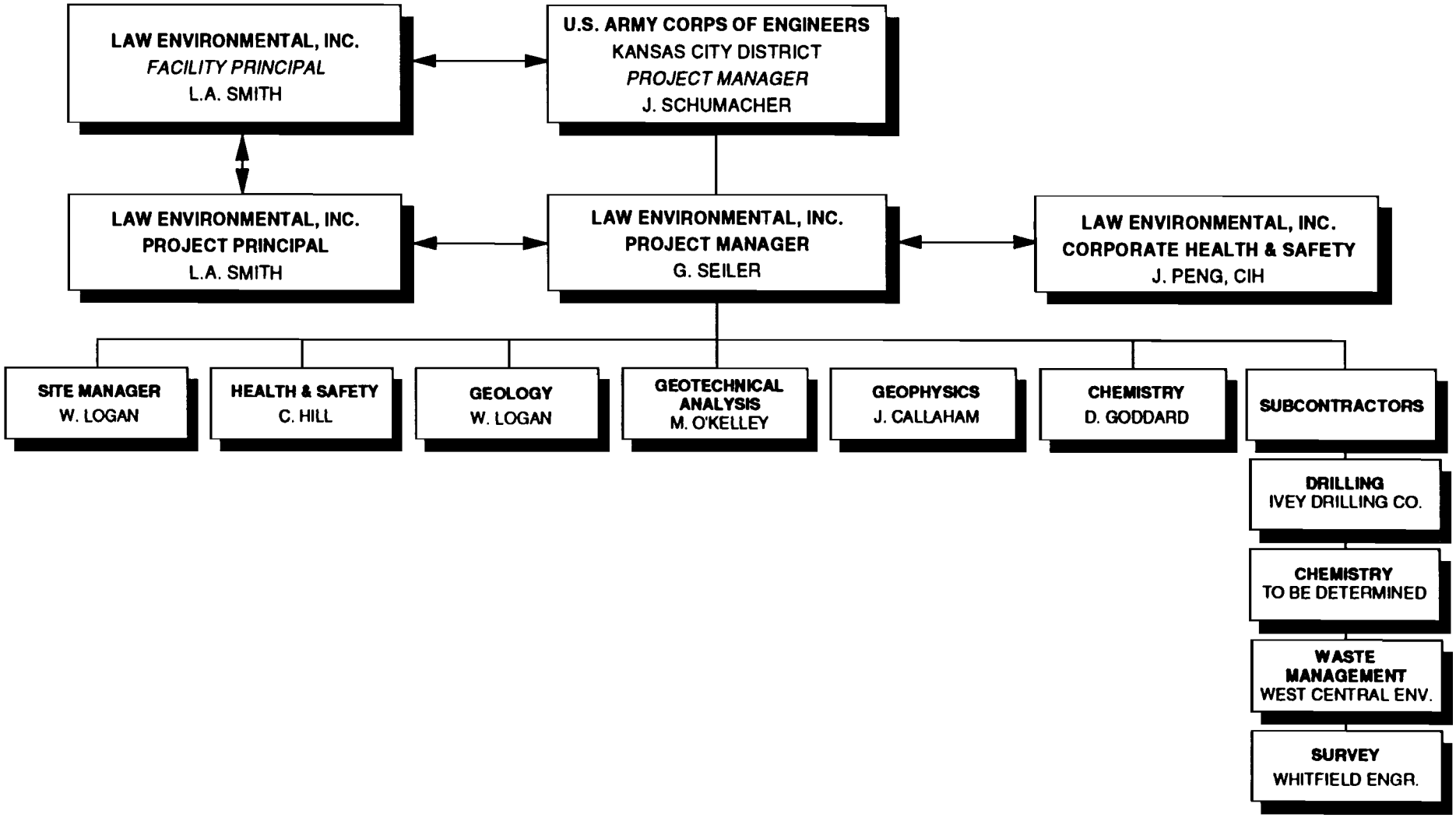
1.3 PROJECT ORGANIZATION AND RESPONSIBILITY

The key individuals and subcontractors involved in the work activities for this project are shown in Figure 1-1.

FIGURE 1-1

PROJECT ORGANIZATION

SITE ASSESSMENTS FOR UST SITES
GRIFFISS AFB, ROME, NEW YORK



2533.10

2.0 SITE DESCRIPTIONS AND PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

Twenty underground storage tank (UST) sites located at eighteen Griffiss AFB buildings are the subjects of these site assessments. Figure 2-1 depicts the location of the eighteen buildings. Law Environmental, Inc. (Law) conducted a site visit of the USTs on July 12 through 14, 1993, for the purpose of gathering information and documentation on each site. Descriptions of the regional geology, hydrogeology, surface water drainage, ecology, land and water use, and climatic conditions for the Griffiss AFB region (Rome, New York) are presented in the Remedial Investigation (RI) Planning Documents prepared for Griffiss AFB (Law, 1993a). The anticipated direction of ground-water flow at each site is based on information reported by Geotech (Geotech, 1991) and from a data base of ground-water elevations developed during the quarterly ground-water sampling of approximately 80 on-base monitoring wells conducted by Law (Law, 1993b). The information provided is based on interviews with current Griffiss AFB personnel, a visual reconnaissance of the sites conducted July 12 through 14, 1993, and a review of the following available reports and drawings obtained from Griffiss AFB.

Griffiss AFB, 1991. Base Exchange Gas Station (Building 337) Soil and Ground-Water Analysis, Samples taken October 9, 1991.

Griffiss AFB, 1990. Tank Removal # 1, Remove/Replace Tanks. Project Number JREZ-90-0146, Drawing Number TD-2036, June 27, 1990.

Griffiss AFB, 1987. Replace Leaking Underground Tanks and Remove Contaminated Soil, Project No. JREZ-87-0140 A & B, Drawing Number TD-1855, Feb, 2, 1987.

Griffiss AFB, No Date. Naval Facilities Engineering Command, Northern Division. Renovation to Building No. 44, NAVFAC Drawing No. 20-60089, Sheet 39 of 56.

Griffiss AFB, No Date. Tank Farms # 1, 2, 3, and Salvage Tanks, Refueling and Defueling Lines Bldg. 101, ID # HF-V-4.

Griffiss AFB, 1973. Building 337, Underground Gasoline Storage Tank Placement, Site Plan, Project No. 1335-74-031, Sheet 1 of 3, October 23, 1973.

Griffiss AFB, 1974. Building 428, Airmens Mess, Heating and Ventilating, Boiler Room Plan and Details. Drawing No. 428-M-1, Dated Last Revision 1-11-1974.

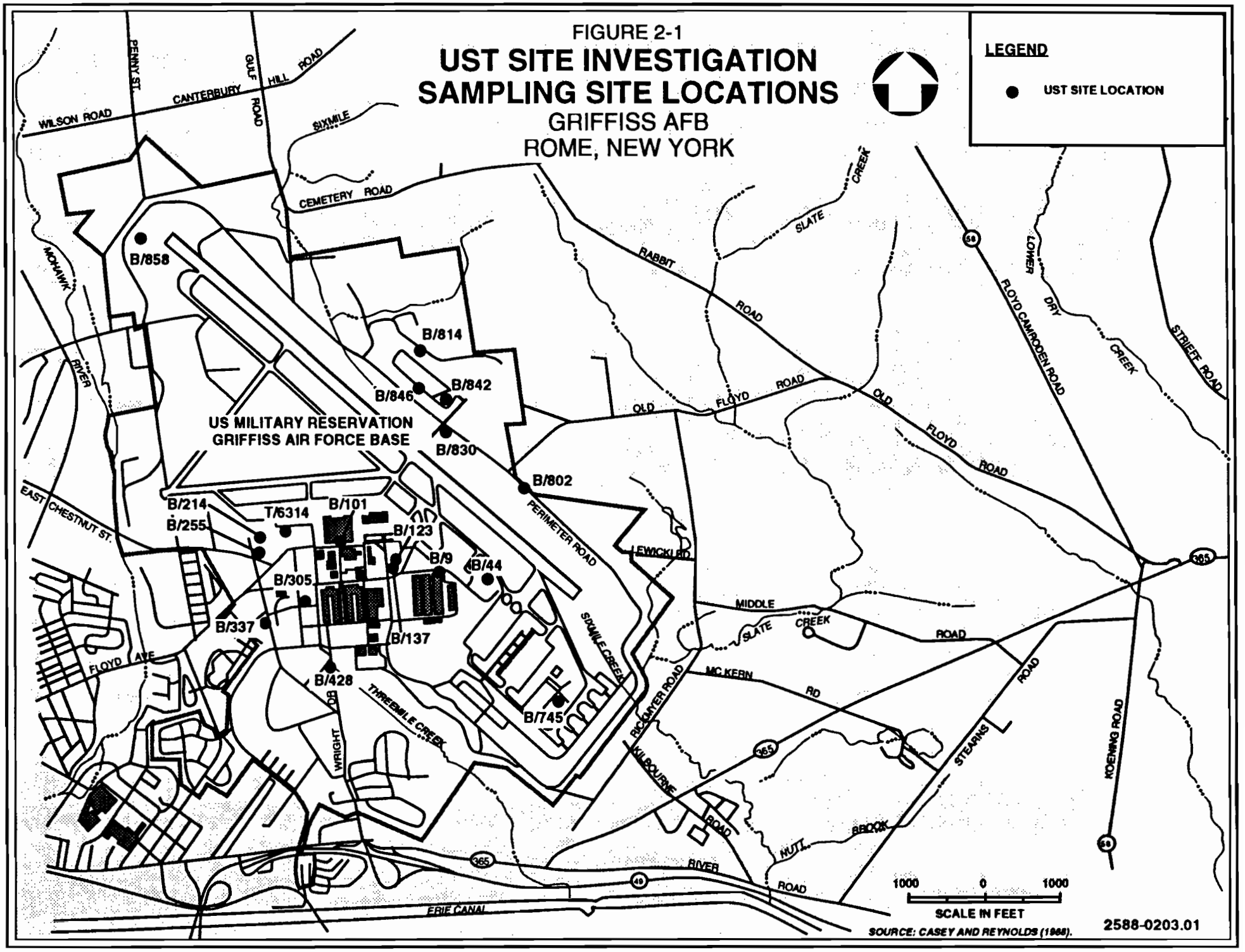


FIGURE 2-1
UST SITE INVESTIGATION
SAMPLING SITE LOCATIONS
GRIFFISS AFB
ROME, NEW YORK
LEGEND
UST SITE LOCATION
US MILITARY RESERVATION
GRIFFISS AIR FORCE BASE
B/858
B/814
B/846
B/842
B/830
B/802
B/214
B/255
T/6314
B/101
B/123
B/9
B/44
B/305
B/337
B/137
B/428
B/745
WILSON ROAD
CANTERBURY ROAD
PENNY ST.
GULF HILL ROAD
SIXMILE CREEK
CEMETERY ROAD
MOHAWK RIVER
RABBIT ROAD
SLATE CREEK
OLD FLOYD ROAD
FLOYD CAMPBODEN ROAD
LOWER DRY CREEK
STRIEFF ROAD
PERIMETER ROAD
EAST CHESTNUT ST.
FLOYD AVE
EWICK RD
MIDDLE SLATE CREEK ROAD
MC KERN RD
STEARNS ROAD
KOENING ROAD
BIGELOW ROAD
KILBOURNE ROAD
HUTT BROOK
WRIGHT RD
THREEMILE CREEK
ERIE CANAL
RIVER ROAD
365
49
1000 0 1000
SCALE IN FEET
SOURCE: CASEY AND REYNOLDS (1988).
2588-0203.01

Griffiss AFB, 1992. Tank 6314, Real Property Accountable Record Installation, Date and Removal Data of Tank 6314, January 29, 1992.

2.1 BUILDING 9

Building 9, the Base Motor Pool, is located at the intersection of Robbins Street and Brooks Road. The UST located at Building 9 is a 250-gallon steel and concrete formed oil/water (O/W) separator located inside the north side of Building 9, adjacent to the Base Motor Pool, "C" Bay wash rack. The O/W separator was reported to have been removed or disconnected; however, during the site visit, it was observed as present, containing sludge with effluent water flowing through the unit to the sanitary sewer. The information regarding the reported abandonment was unavailable at the time of the site visit. The area surrounding the O/W separator was covered with concrete at a minimum thickness of 30 inches. This condition will require the use of a concrete coring machine to core through the concrete floor. Figure 2-2 shows the location of the Building 9 proposed soil boring. No previous assessments have been conducted at the Building 9 site.

2.2 BUILDING 44

Building 44 is located at the north end of Brooks Road adjacent to Apron 1. The former UST at this site was a 110-gallon steel unleaded fuel tank which was later converted to diesel fuel. The former tank was located at the southeast corner of Building 44. The UST was excavated and the area was backfilled. The information regarding the tank excavation activities was unavailable at the time of the July 1993 site visit. It appeared that a section of the sidewalk had been removed to excavate the UST. This section has been backfilled but a depression exists with grass cover. Figure 2-3 shows the location of the Building 44 proposed soil boring. No previous assessments have been conducted at the Building 44 UST site.

2.3 BUILDING 101

Building 101, a hangar, is located along Hanger Road. The abandoned UST at this site, a 12,000-gallon steel salvage fuel tank, was formerly used as a part of the refueling and defueling system. This site is located south of the southeast corner of Building 101. The information regarding the in-place abandonment and activities was unavailable at the time of the July 1993 site visit. The tank access covers (2) are visible from the road at the UST location. The surrounding area of the site is grass covered with underground utilities reportedly running parallel

FIGURE 2-2

PROPOSED SOIL BORING LOCATION
BUILDING 9
GRIFFISS AFB
ROME, NEW YORK

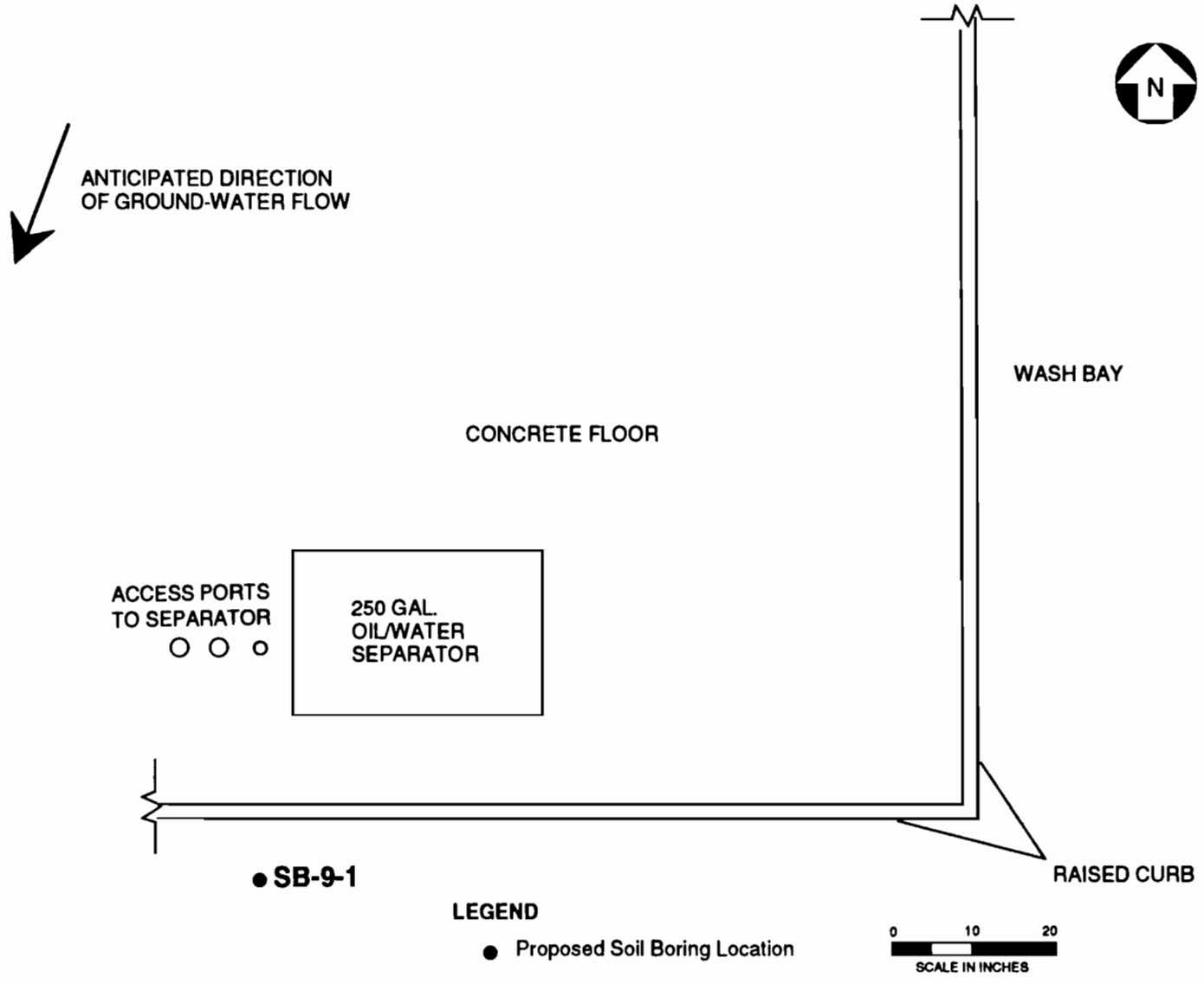


FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

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FIGURE 2-3

PROPOSED SOIL BORING LOCATION BUILDING 44

GRIFFISS AFB
ROME, NEW YORK

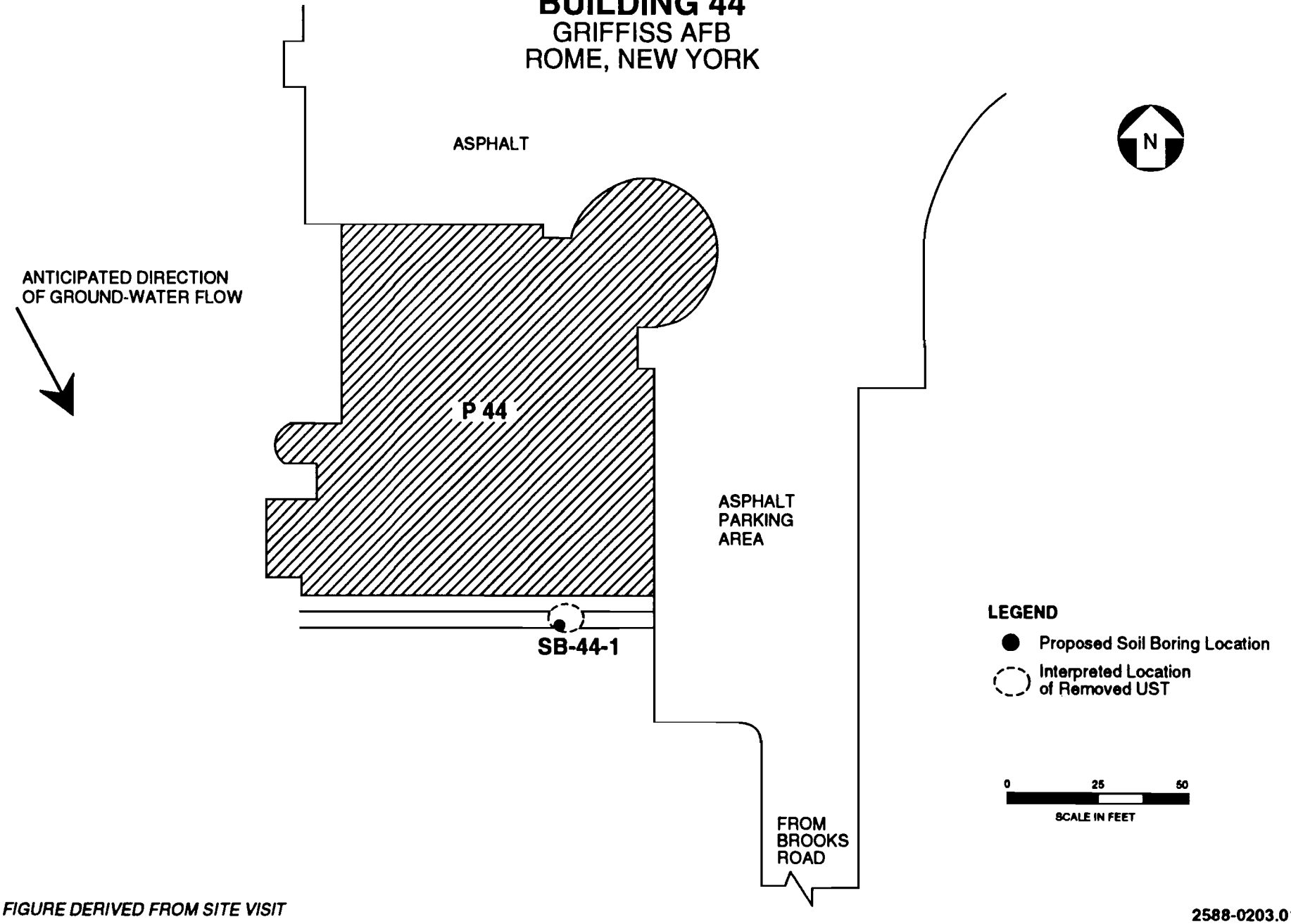

FIGURE DERIVED FROM SITE VISIT

2588-0203.01

to Hanger Road. Figure 2-4 shows the location of the Building 101 proposed soil borings. The UST is reported to be no longer in service and was disconnected from the fuel system. The tank was abandoned in-place and was filled with sand. No previous assessments have been conducted at the location of the UST site.

2.4 BUILDING 123

Building 123 is located near the intersection of Brooks Road and Otis Street. The former UST at this site, a 300-gallon steel waste oil tank, was located east of the mechanical room at the northeast corner of Building 123. Information regarding the tank excavation activities was unavailable at the time of the site visit. The former tank was excavated and the area was backfilled and graded smooth. The area of the former UST is covered with grass and shows no visible signs of an excavation pit. Figure 2-5 shows the location of the Building 123 proposed soil boring. No previous assessments have been conducted at the Building 123 UST site.

2.5 BUILDING 137

Former Building 137 was located northeast of the intersection of Otis Street and Brooks Road. The former UST at this site, a 275-gallon steel generator fuel supply tank, held leaded gasoline until it was later switched to unleaded gasoline as part of a basewide transition from leaded gasoline to unleaded gasoline in 1986. The tank passed a tightness test in 1986. The generator supply tank was reportedly disconnected and removed; however, the date of disconnection is unknown. No previous assessments have been conducted at the former Building 137 UST site. Figure 2-6 shows the location of the proposed soil boring.

2.6 BUILDING 214

Building 214, Liquid Fuel Testing Facility, is located on the north end of MacDill Street. The former UST was located east of the southeast corner of Building 214. The former UST at this site was a 275-gallon steel waste oil tank which was reportedly excavated and replaced with a tank of the same capacity. Overhead power lines are within ten feet of the building and tank. Figure 2-7 shows the location of the Building 214 proposed soil boring. Information concerning tank tightness testing and when the tank was removed and replaced was unavailable at the time of the site visit. No previous assessments have been conducted at the Building 214 UST site.

FIGURE 2-4

PROPOSED SOIL BORING LOCATIONS
BUILDING 101

GRIFFISS AFB
ROME, NEW YORK

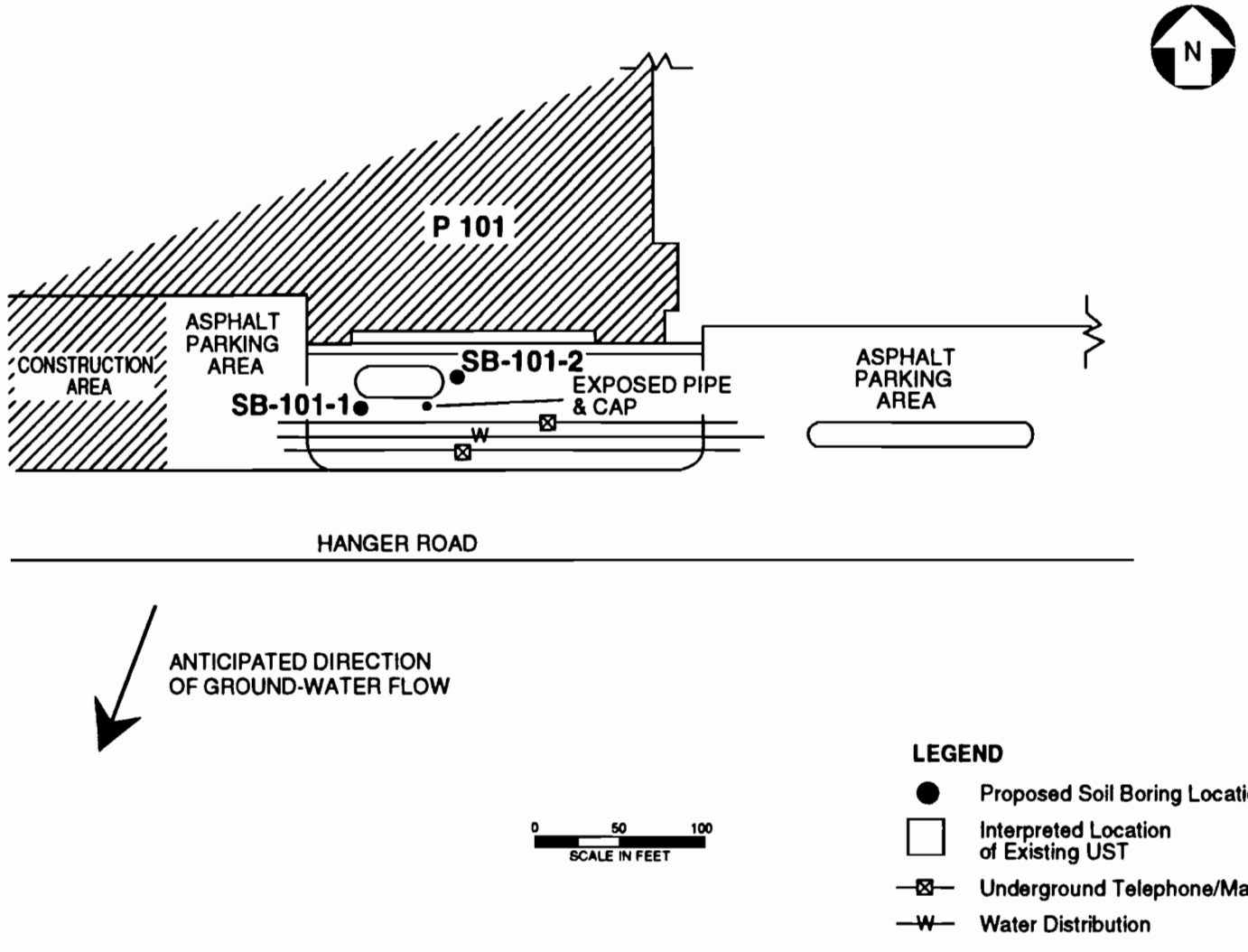

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

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FIGURE 2-5

PROPOSED SOIL BORING LOCATION
BUILDING 123

GRIFFISS AFB
ROME, NEW YORK

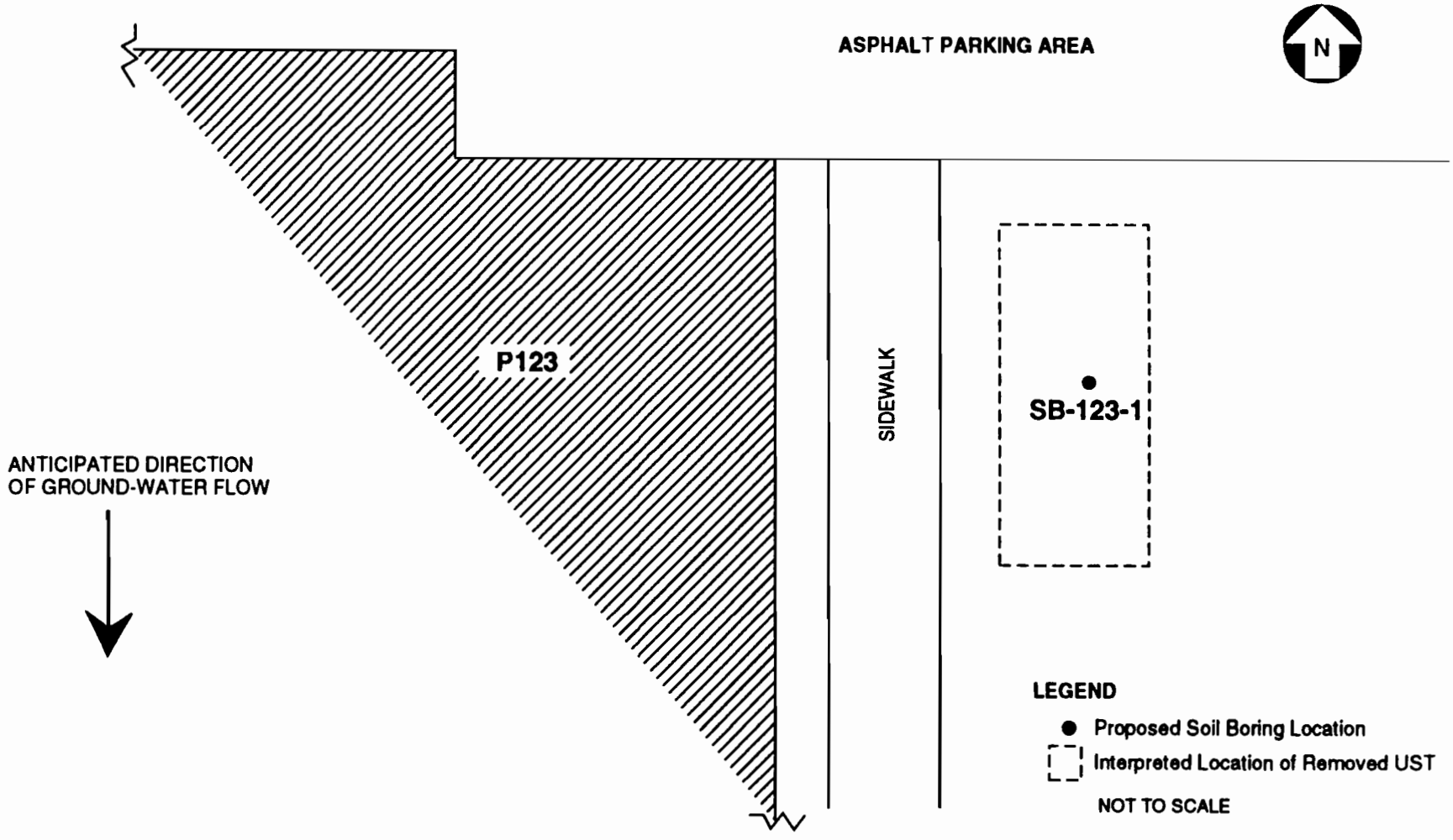

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

FIGURE 2-6

PROPOSED SOIL BORING LOCATION
BUILDING 137

GRIFFISS AFB
ROME, NEW YORK

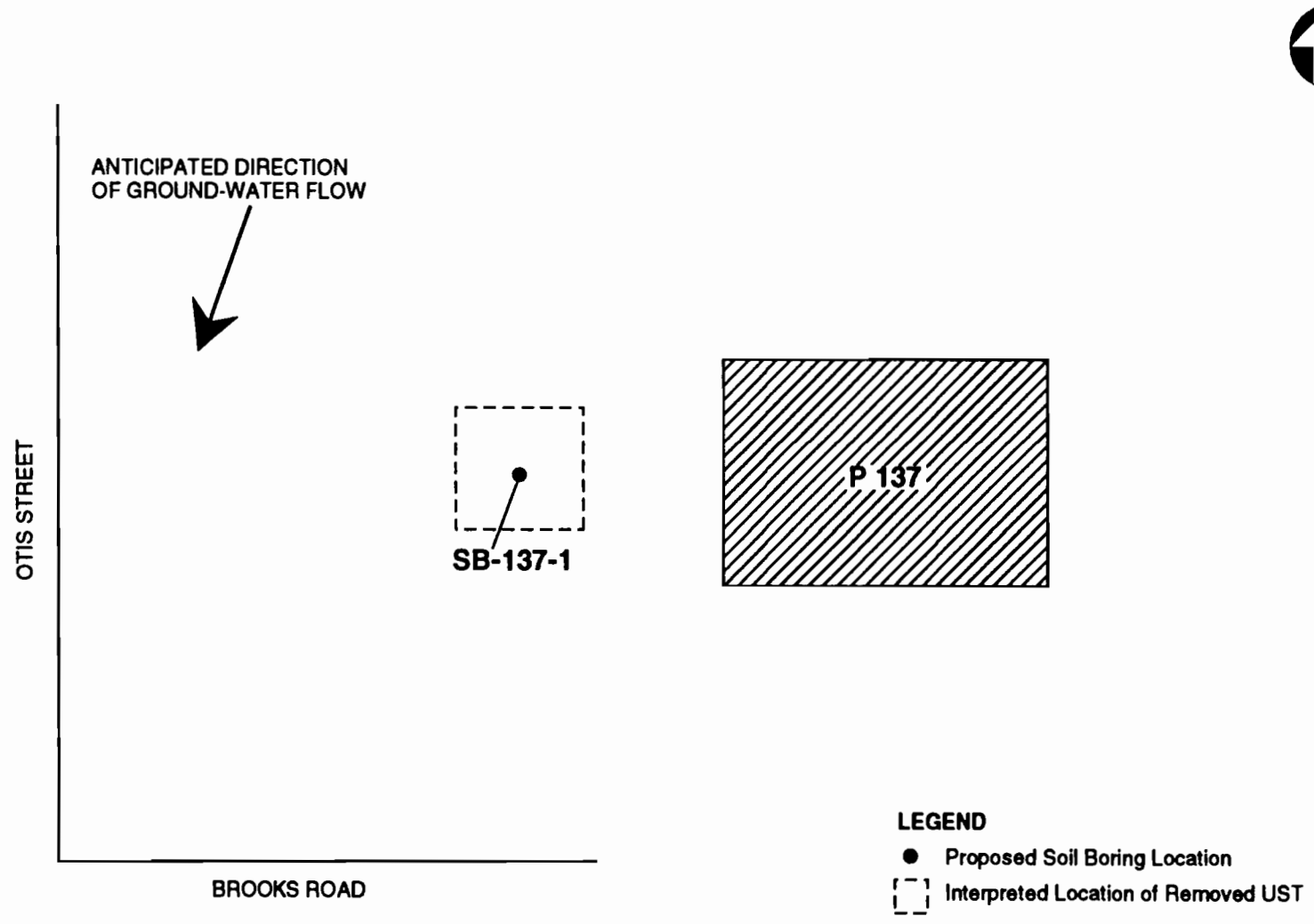

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

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FIGURE 2-7

PROPOSED SOIL BORING LOCATION
BUILDING 214

GRIFFISS AFB
ROME, NEW YORK

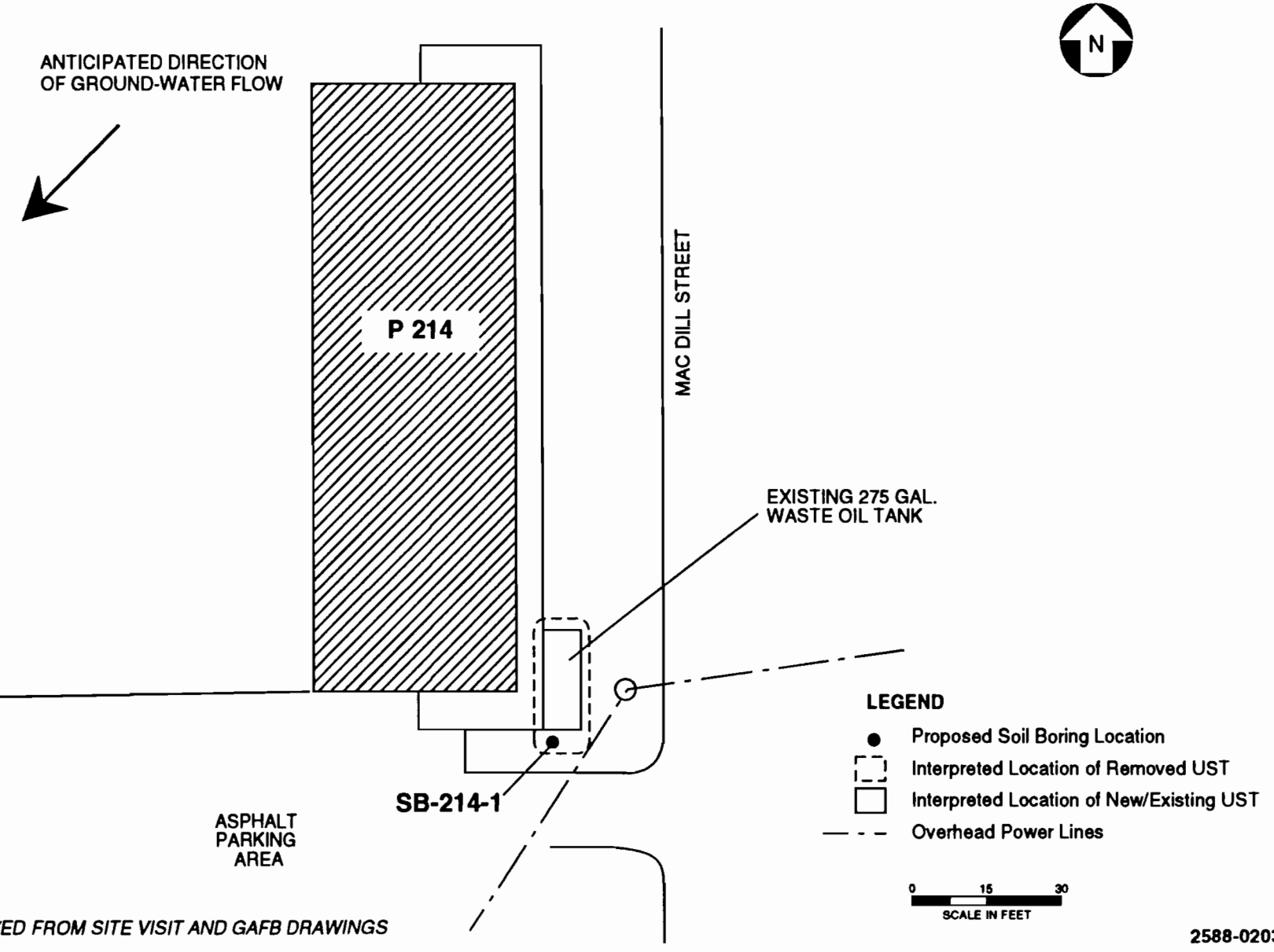

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

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2.7 BUILDING 255

Building 255 is located near the intersection of Mohawk Drive and Langley Road. The former UST was located in close proximity to the building, south of the mechanical room which is located in the northwest corner of Building 255. The former tank was a 500-gallon steel waste oil tank which was excavated and backfilled with fill material. The surrounding area is an asphalt covered parking lot. Figure 2-8 shows the location of the Building 255 proposed soil boring. Information concerning tank tightness testing and the date of UST removal was unavailable at the time of the site visit. No previous assessments have been conducted at the Building 255 former UST site.

2.8 BUILDING 305

Building 305, Hobby Shop, is located east of March Street. The former tank was located south of the entrance/exit ramp and in close proximity to Building 305. The former UST at this site was a 550-gallon steel waste oil tank which was removed and replaced with a 275-gallon waste oil tank in the same location. Information concerning tank tightness testing and when the tank was removed and replaced was unavailable at the time of the site visit. Figure 2-9 shows the location of the Building 305 proposed soil boring. No previous assessments have been conducted at the Building 305 UST site.

2.9 BUILDING 337

Building 337, service station, is located southwest of the intersection of Hill Road and Central Ave. The abandoned USTs are located at the north end of the facility. The UST site at Building 337 reportedly consists of two disconnected and abandoned in-place 4,000-gallon diesel storage tanks. One of the diesel USTs was abandoned in the 1970s and is reportedly filled with sand. Information on the other tank was not available at the time of the site visit.

A number of in-service USTs are also located at this site, consisting of:

- One 15,000-gallon and two 10,000-gallon unleaded gasoline storage tanks. These USTs are located approximately 50 feet to the northwest of the abandoned diesel USTs. This site was also the former location of four 10,000-gallon, unleaded gasoline USTs which were removed and subsequently replaced to meet current regulatory requirements. Ground-water analysis performed at this site during tank removal indicated petroleum hydrocarbon contamination comprised of benzene, toluene, xylene and ethylbenzene. The following levels were detected in one ground-water sample collected in 1991: 1.6 milligrams per liter (mg/L) of benzene, 42 mg/L of toluene, 31 mg/L of xylenes, and 4 mg/L of ethylbenzene (Griffiss AFB, 1991b).

FIGURE 2-8

PROPOSED SOIL BORING LOCATION
BUILDING 255

GRIFFISS AFB
ROME, NEW YORK

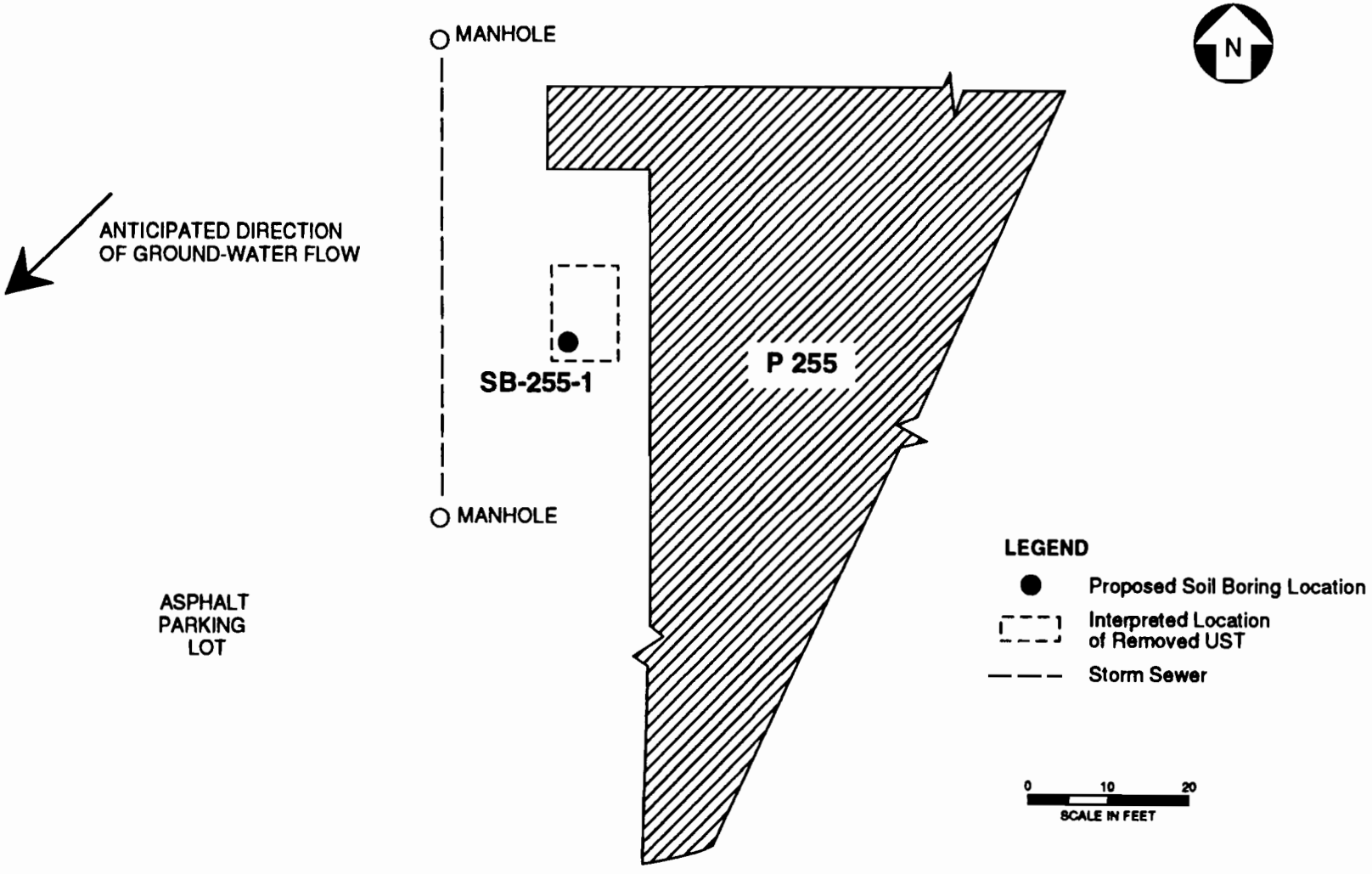

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

FIGURE 2-9

PROPOSED SOIL BORING LOCATION
BUILDING 305

GRIFFISS AFB
ROME, NEW YORK

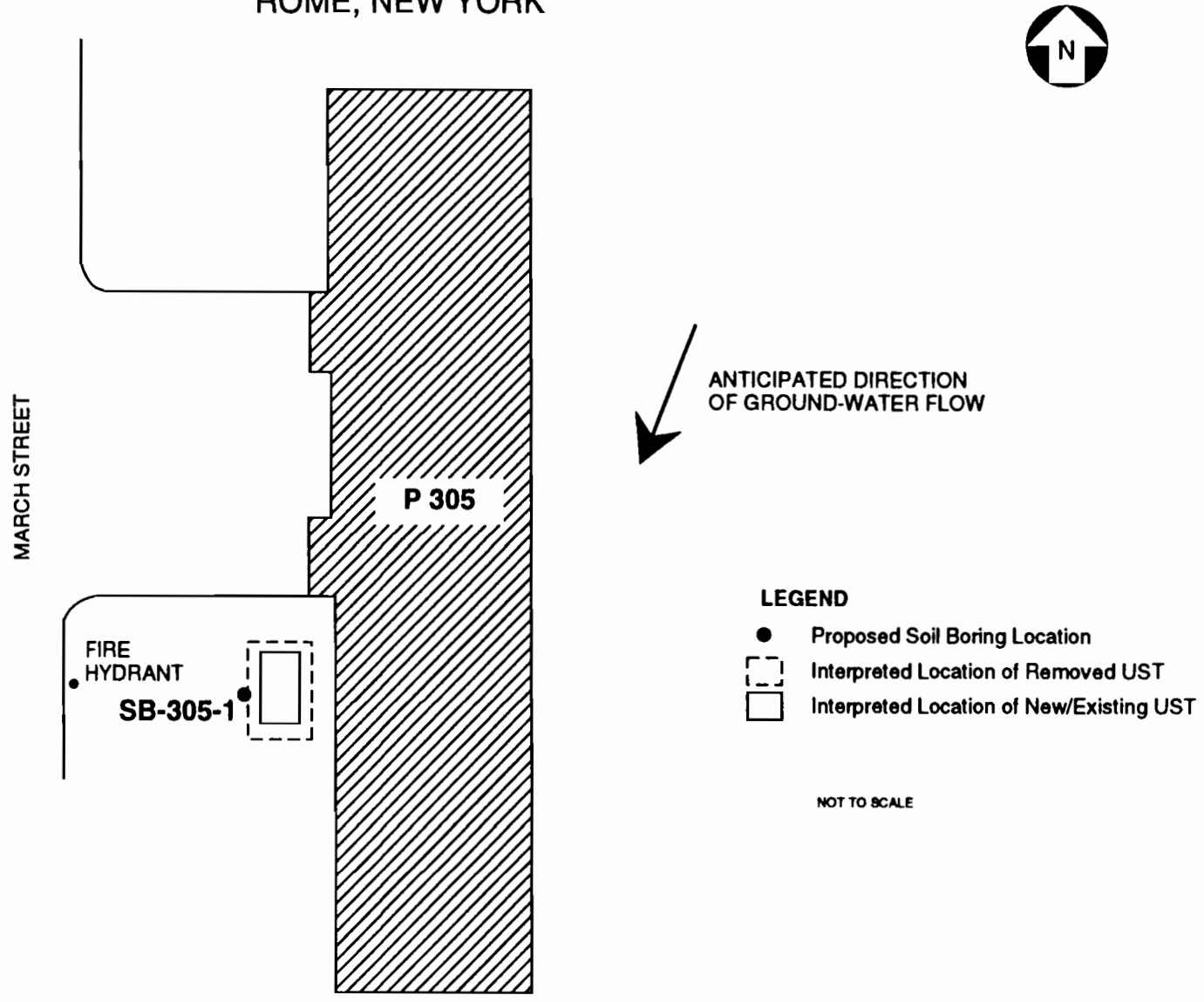

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

- One 550-gallon waste oil UST located approximately 30 feet southwest of the abandoned diesel UST location.

- One 550-gallon No. 2 fuel oil UST located to the west of Building 537 between overhead power lines to the south and the waste oil UST to the northeast. This UST replaced an older UST at the same location.

No previous assessments have been conducted at the Building 337 UST site. Figure 2-10 shows the location of the existing USTs at Building 337 and proposed soil borings.

2.10 BUILDING 428

Building 428, Base Legal Services, is located in the southwestern portion of the base between Wright Drive and Kirkland Drive. Building 428 was the former Airmen's Mess, which presently houses the Base Legal Services. The USTs are located approximately 40 feet from the south main entrance. The tank access covers are visible from the road at the existing 2,000-gallon UST location. The surrounding area of the site is grass covered with underground utilities reportedly running southwest of the reported tank field.

The UST site at Building 428 reportedly consists of three USTs:

- A 550-gallon waste oil storage tank. A review of site photographs indicates that the tank has been removed. Base records concerning possible tank removal were not available at the time of the site visit.

- A 7,500-gallon No. 5 heating oil storage tank. Prior to the site visit, previous information indicated that the UST was abandoned in place, full of product, for an unknown number of years. A review of site photographs indicates that the tank has been removed. Base records concerning possible tank removal were not available at the time of the site visit.

- A 2,000-gallon No. 5 heating oil storage tank. The UST is a replacement tank for the previously removed 7,500-gallon fuel oil UST. The UST is currently full of product but not in service.

No previous assessments have been conducted at the Building 428 UST site. Figure 2-11 shows the location of Building 428 proposed monitoring well and soil borings.

FIGURE 2-10

PROPOSED SOIL BORING LOCATIONS
BUILDING 337

GRIFFISS AFB
ROME, NEW YORK

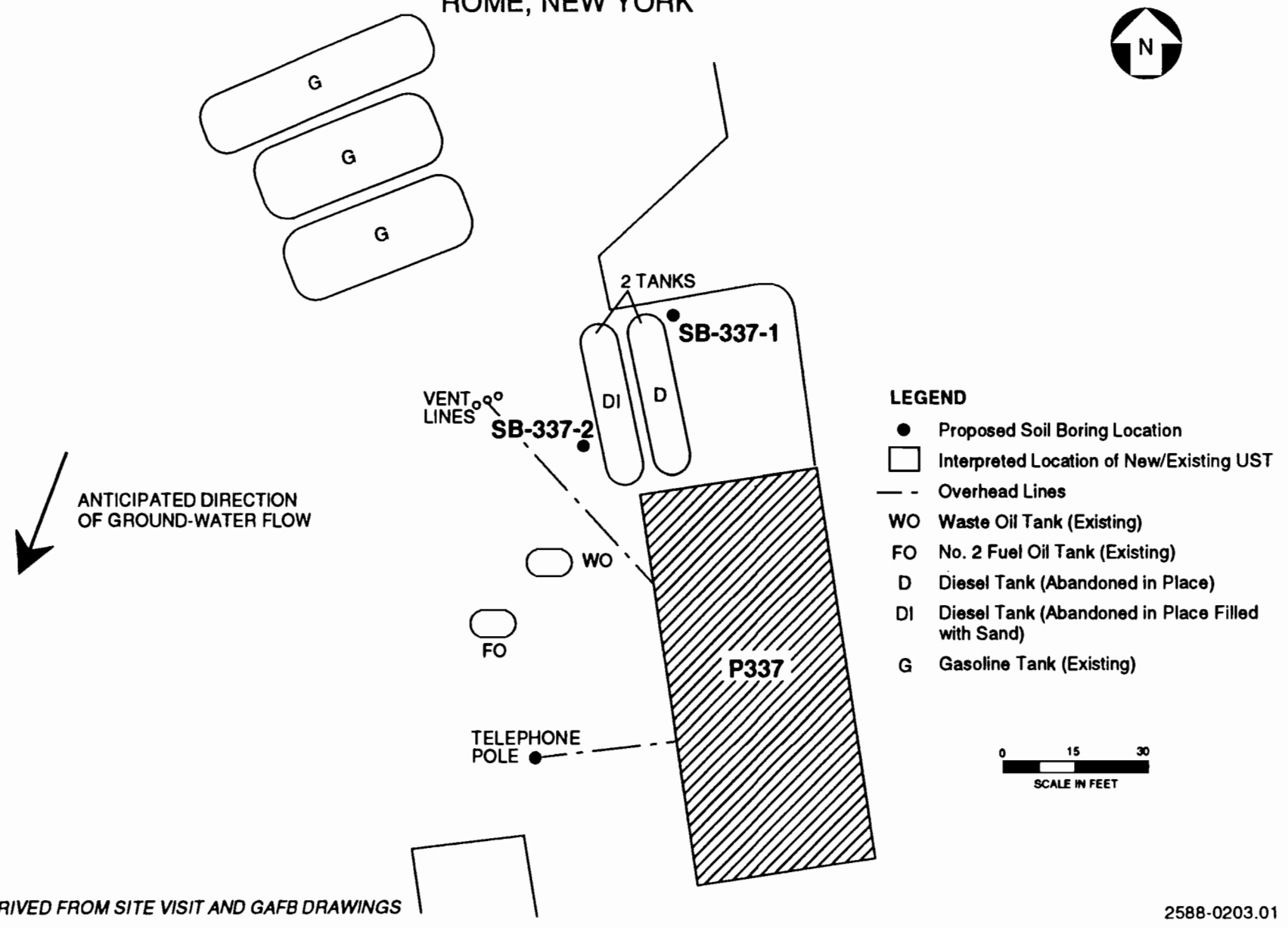

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

FIGURE 2-11

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS BUILDING 428

GRIFFISS AFB
ROME, NEW YORK

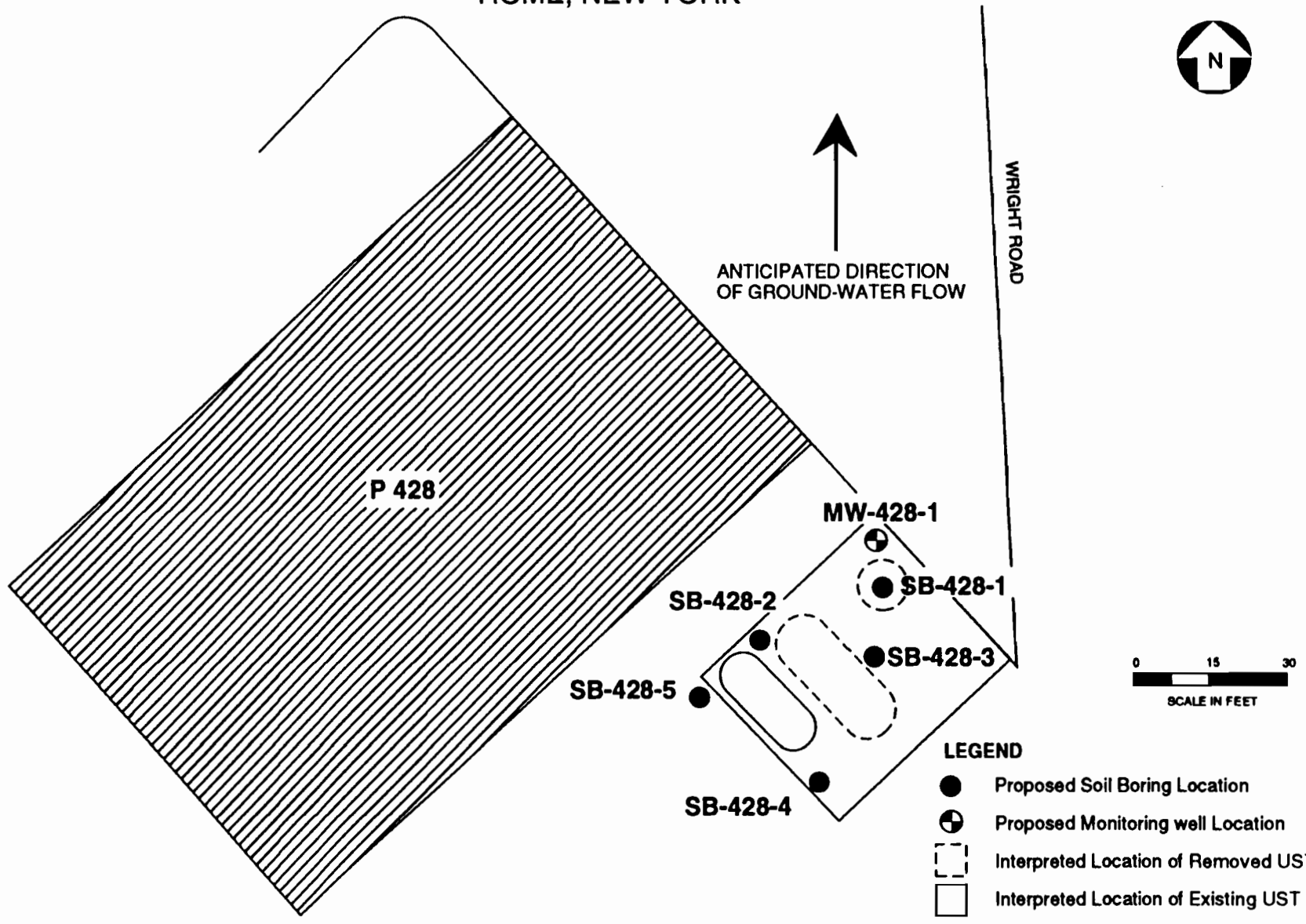

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.02

2.11 BUILDING 745

Building 745 is located adjacent to the Taxiway 1 Alert Apron and Hound Dog Road. The former UST at this site, a 1,200-gallon No. 2 fuel oil steel tank, was located northwest of Building 745. The former tank was removed and replaced with another 1,200-gallon tank at the same location. The area surrounding Building 745 in the vicinity of the UST is grass covered with a concrete pad covering the replacement tank. Figure 2-12 shows the location of the Building 745 proposed soil borings and monitoring wells. Information concerning the tank excavation and use of the former tank was unavailable at the time of the site visit.

2.12 BUILDING 802

Building 802 is located on the north side of the base on Perimeter Road. The former UST was located at Building 802 between the perimeter fence and a transformer pad. The former UST at this site contained diesel fuel. The 275-gallon generator supply tank was reportedly disconnected and removed; however, the date of disconnection was unavailable at the time of the site visit. No previous assessments have been conducted at the Building 802 former UST site. Figure 2-13 shows the location of the Building 802 proposed soil boring.

2.13 BUILDING 814

Building 814 is located on a small hill which lies east of the Weapons Storage Area. The former UST at this site is reportedly either a 275-gallon or a 550-gallon steel tank. Base documents list conflicting information concerning tank size. The former UST served as a generator fuel supply tank for the former TACAN site and was reportedly disconnected and abandoned in place in 1989. Information concerning tank abandonment was unavailable at the time of the site visit. The area in the vicinity of the former UST site is covered with grass. No previous assessments have been conducted at the Building 814 former UST site. Figure 2-14 shows the location of the Building 814 proposed soil boring.

2.14 BUILDING 830

Building 830 is located on the north side of the base along Perimeter Road and overlooks the main runway. The former UST at this site was a 275-gallon steel generator fuel supply tank which held unleaded gasoline and was later switched to diesel fuel. According to base documents, the unit passed tank tightness testing in 1986. The date of the UST disconnection and removal is unknown. A small depression marks the location of the former tank and the area is covered with grass.

FIGURE 2-12

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS - BUILDING 745

GRIFFISS AFB
ROME, NEW YORK

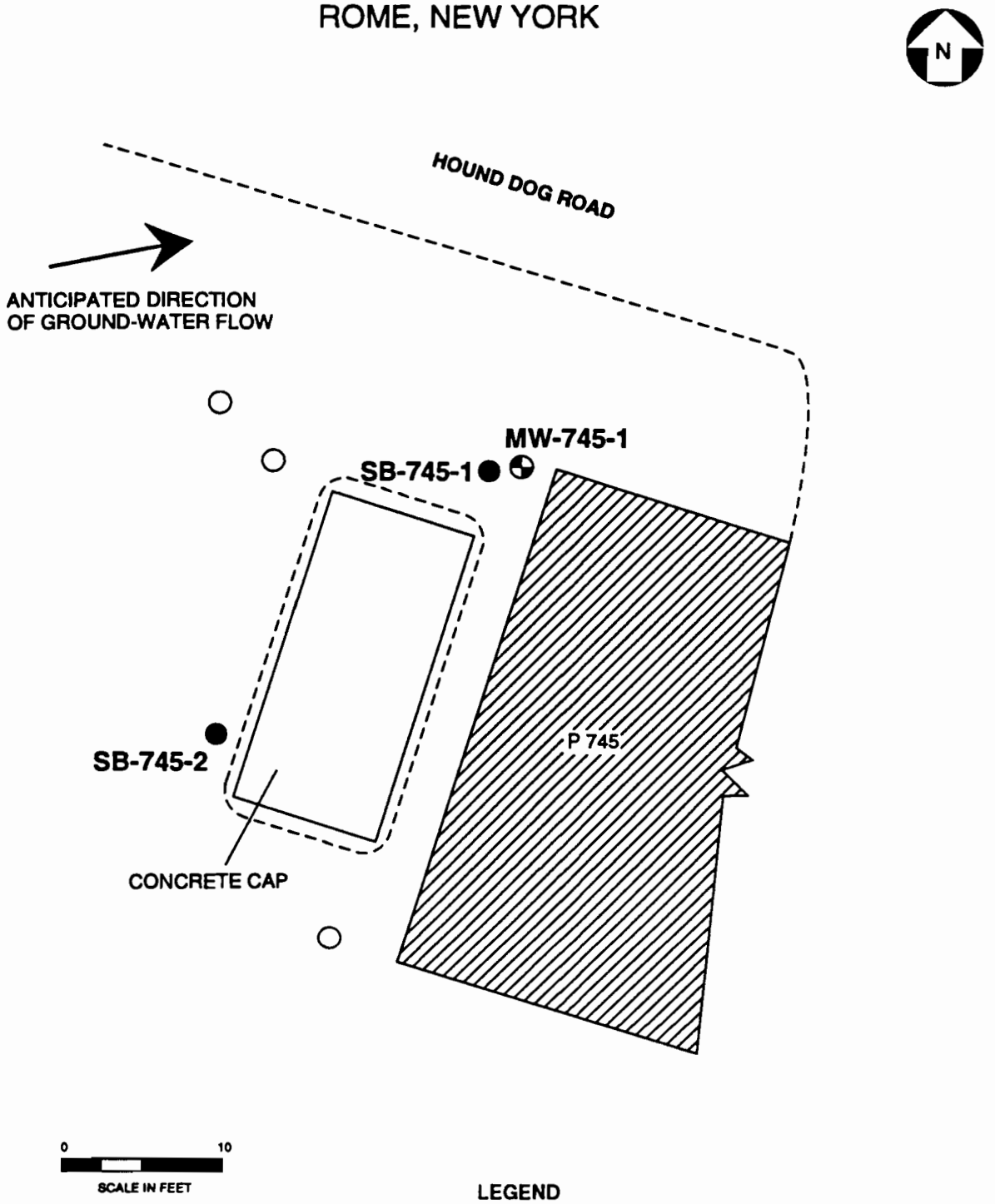

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.02

FIGURE 2-13

PROPOSED SOIL BORING LOCATION BUILDING 802

GRIFFISS AFB
ROME, NEW YORK

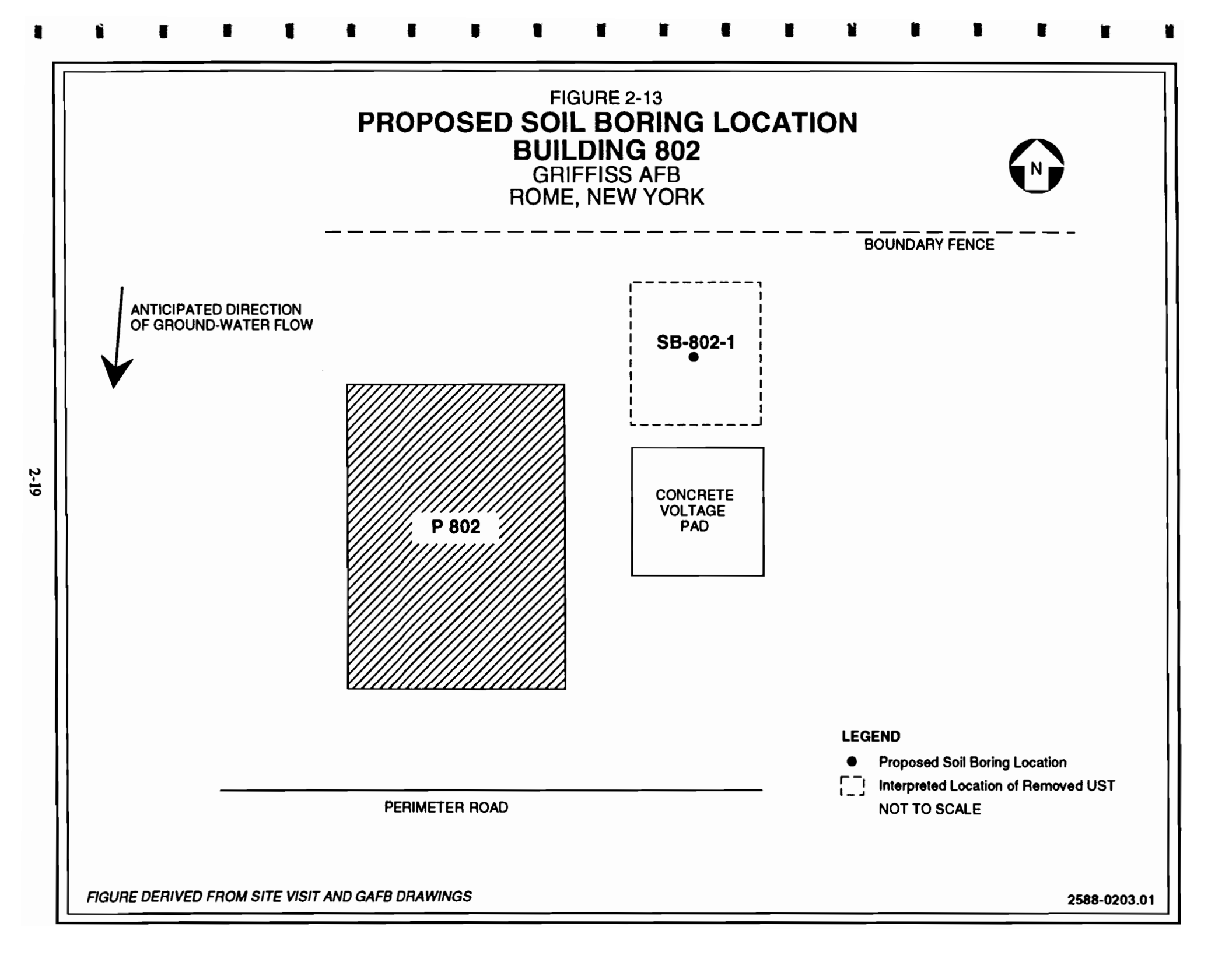

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

FIGURE 2-14

PROPOSED SOIL BORING LOCATION
BUILDING 814

GRIFFISS AFB
ROME, NEW YORK

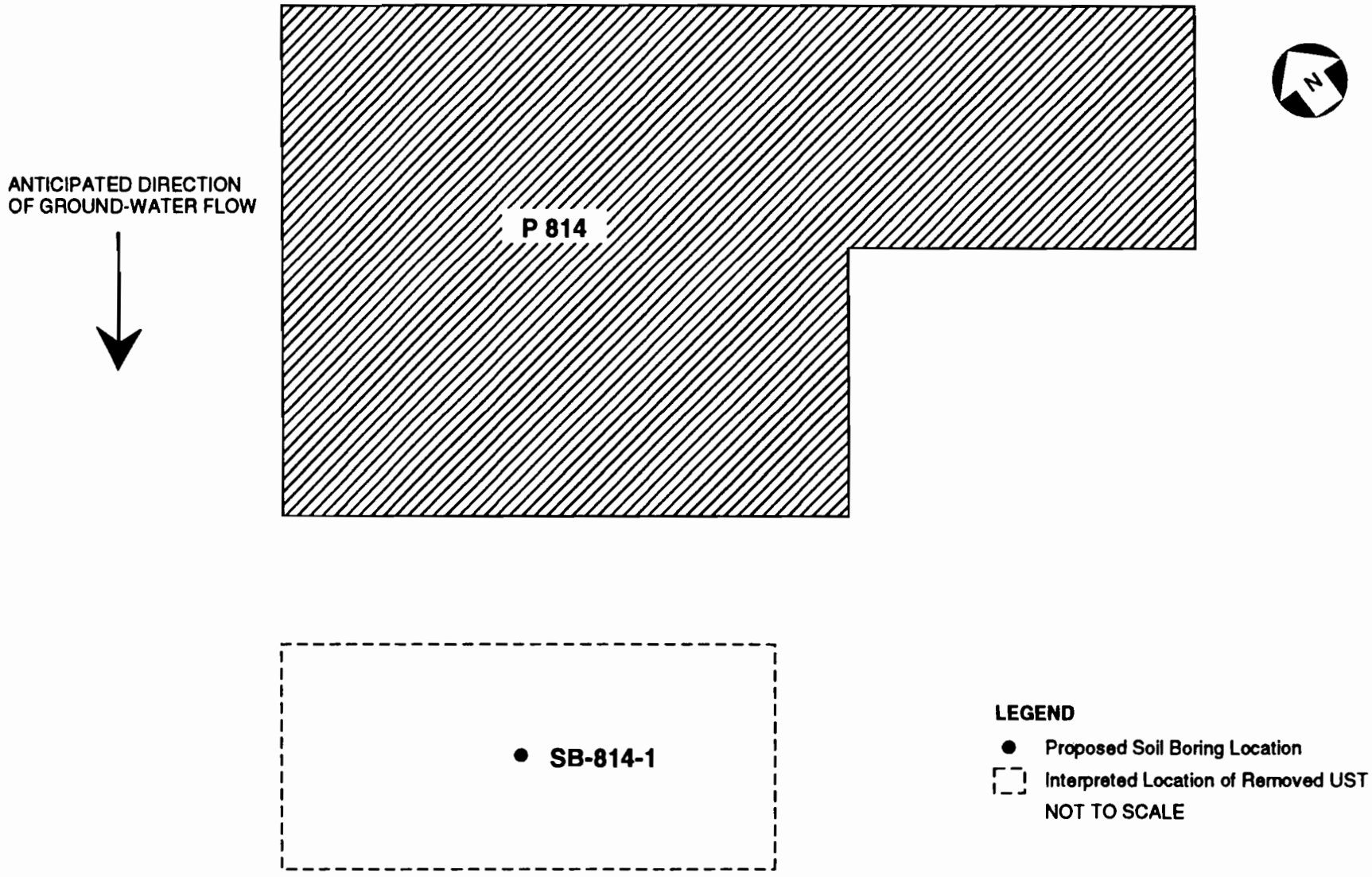

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

No previous assessments have been conducted at the Building 830 former UST site. Figure 2-15 shows the location of the Building 830 proposed soil boring.

2.15 BUILDING 842

Building 842 is located in the Weapons Storage Area north of Perimeter Road. The former UST at this site, a 5,000-gallon steel-constructed diesel fuel tank, was located on the north side of Building 842. The former tank was removed and replaced with a 2,500-gallon fiberglass tank at the same location. The area surrounding the replacement UST is covered with grass with concrete covering the UST. Information concerning the tank excavation and installation of the second tank was unavailable at the time of the site visit. Base personnel indicated that heavy equipment may have damaged the replacement tank.

No previous assessments have been conducted at the Building 842 former UST site. Figure 2-16 shows the location of the Building 842 proposed soil borings.

2.16 BUILDING 846

Building 846 is located inside the Weapons Storage Area, which is located north of Perimeter Road. The former UST at this site, a 1,500-gallon No. 2 fuel oil steel tank, was located south of Building 846. The former tank was removed and replaced with a tank of the same capacity, reportedly conforming with current UST regulations. In 1987, the former tank was tightness-tested and found to be satisfactory. Information concerning the tank excavation activities was unavailable at the time of the site visit. The area at the UST location is covered with concrete.

Previous investigations have reportedly been conducted, but the information regarding the type of assessments or procedures used were unavailable at the time of the site visit. Figure 2-17 shows the location of the Building 846 proposed soil borings and monitoring well.

2.17 BUILDING 858

Building 858 is located on the north side of the base, just off Perimeter Road overlooking Taxiway 8. This building housed the runway localizer generator. The former UST at this site consists of a 275-gallon steel generator fuel supply tank which may have contained either unleaded gasoline or diesel. The tank was reportedly disconnected

FIGURE 2-15

PROPOSED SOIL BORING LOCATION
BUILDING 830

GRIFFISS AFB
ROME, NEW YORK

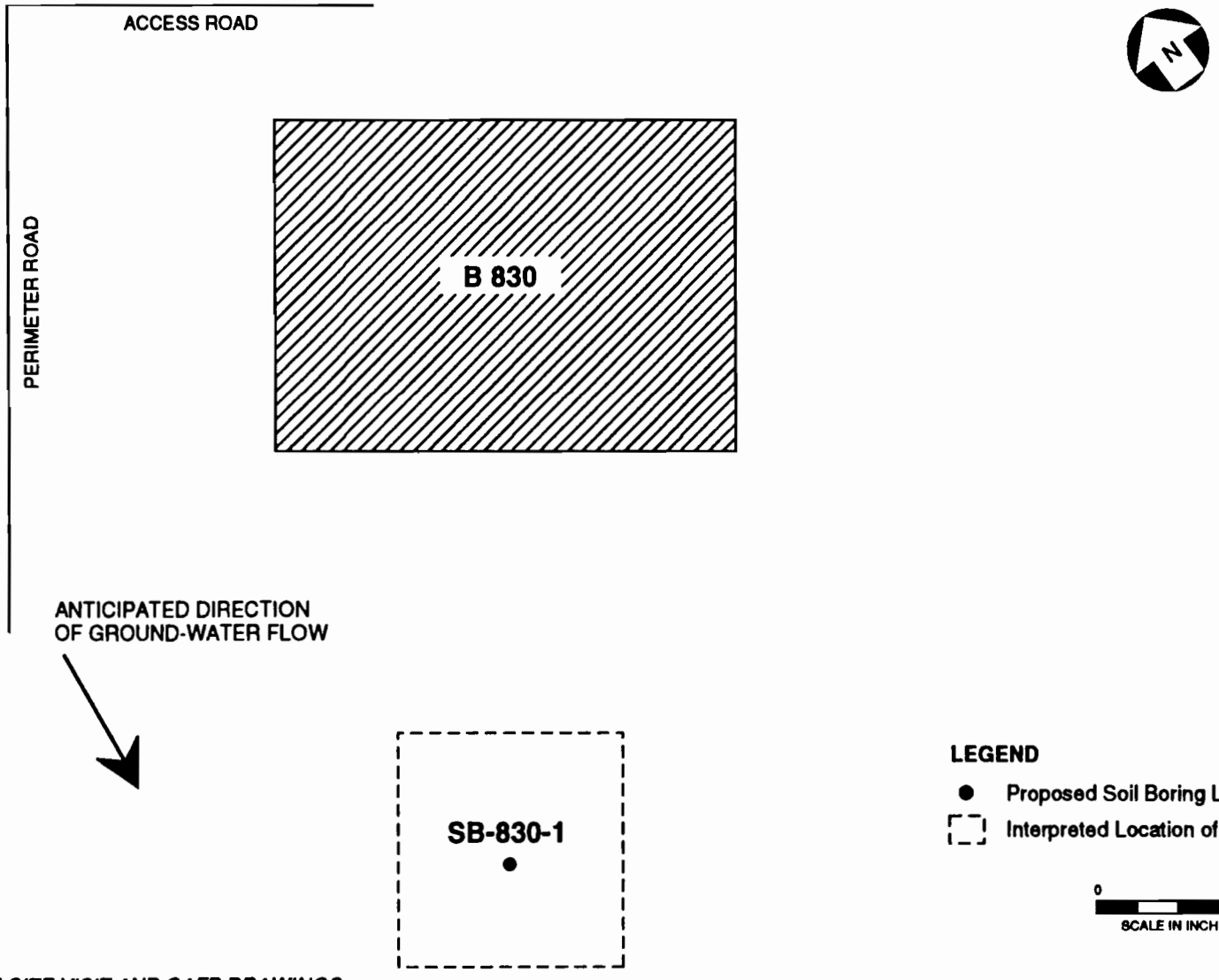

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

FIGURE 2-16

PROPOSED SOIL BORING LOCATIONS
BUILDING 842

GRIFFISS AFB
ROME, NEW YORK

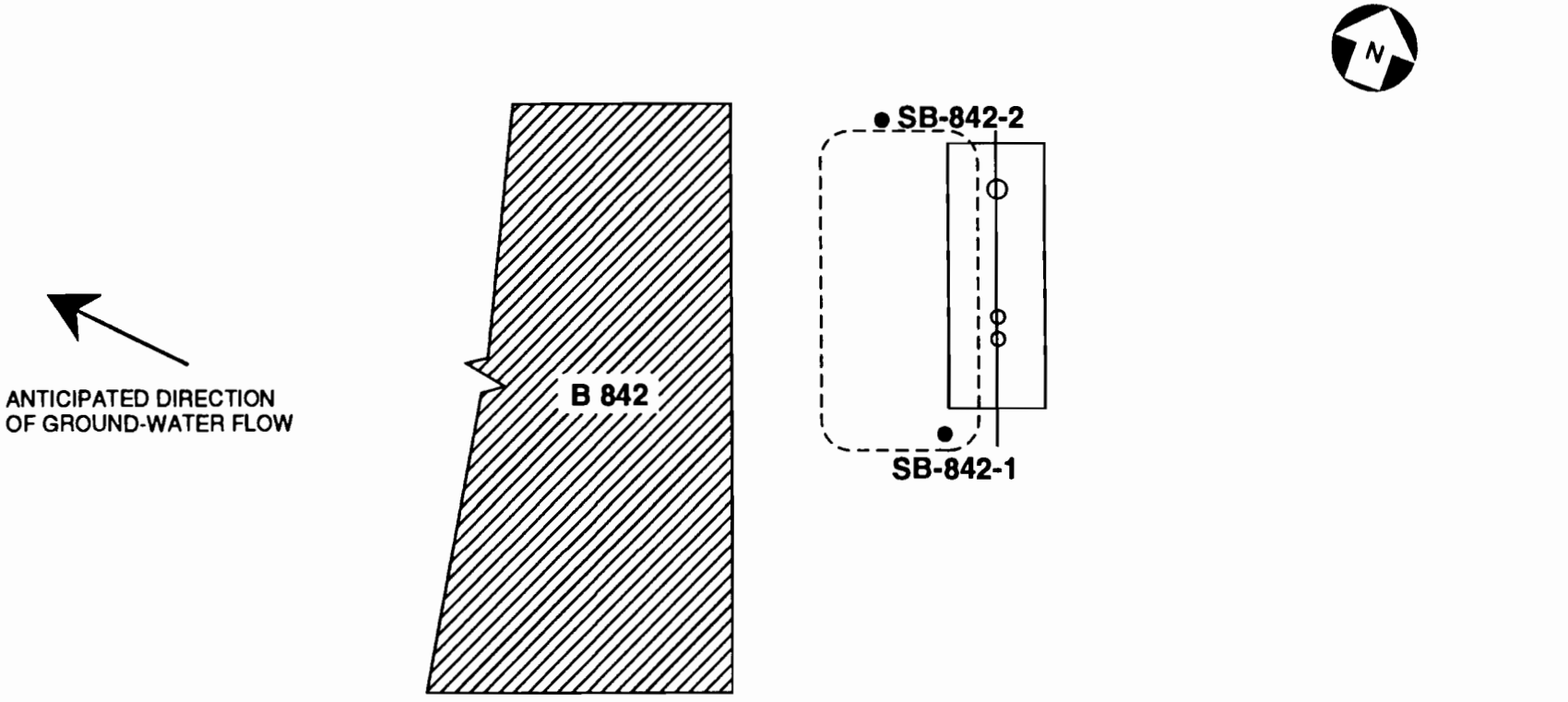

FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

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FIGURE 2-17

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS BUILDING 846

GRIFFISS AFB
ROME, NEW YORK

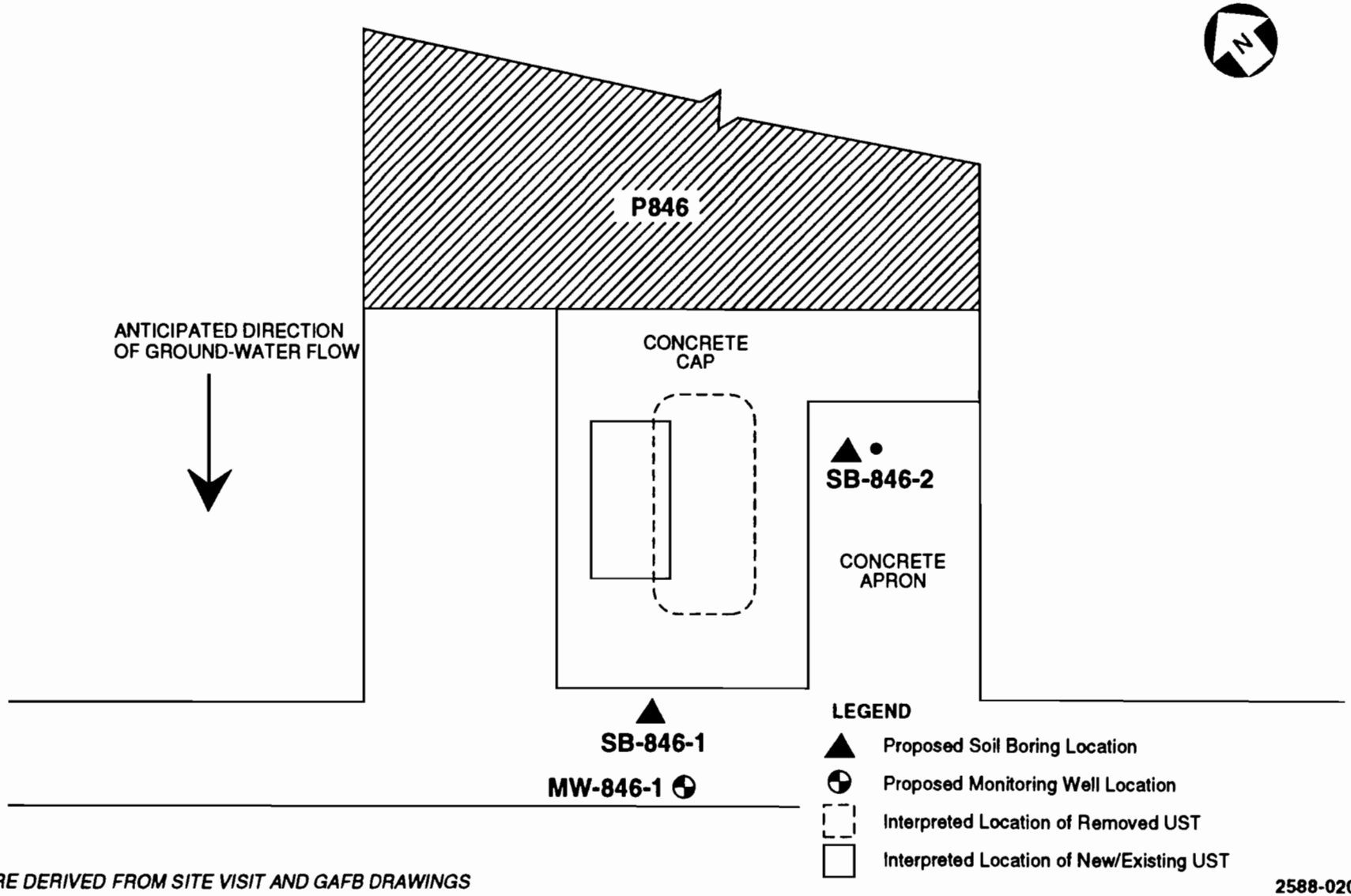


FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.02

and abandoned in place to allow for the installation of a 40-gallon aboveground storage tank next to the generator. The tank passed a tightness test conducted in 1986. It was observed during the site visit that the former UST has been removed. The date of excavation of the UST is unknown.

No previous assessments have been conducted at Building 802 former UST site. Figure 2-18 shows the location of the Building 858 proposed soil boring.

2.18 TANK 6314

Tank 6314 was located southeast of Apron 4 and west of Hangar Building 101. The former UST at this site, a 2,000-gallon steel Aviation (AVGAS) fuel tank, was reportedly excavated and backfilled. The information regarding the tank excavation and activities was unavailable at the time of the site visit. The out of service fuel dispenser and hose reel are visible from the Hanger Road at the UST location. The surrounding area of the site is grass covered with a 14-foot by 14-foot depression covered with grass.

No previous assessments have been conducted at the Building 6314 former UST site. Figure 2-19 shows the location of the Building 6314 proposed soil borings.

FIGURE 2-18

PROPOSED SOIL BORING LOCATION BUILDING 858

GRIFFISS AFB
ROME, NEW YORK

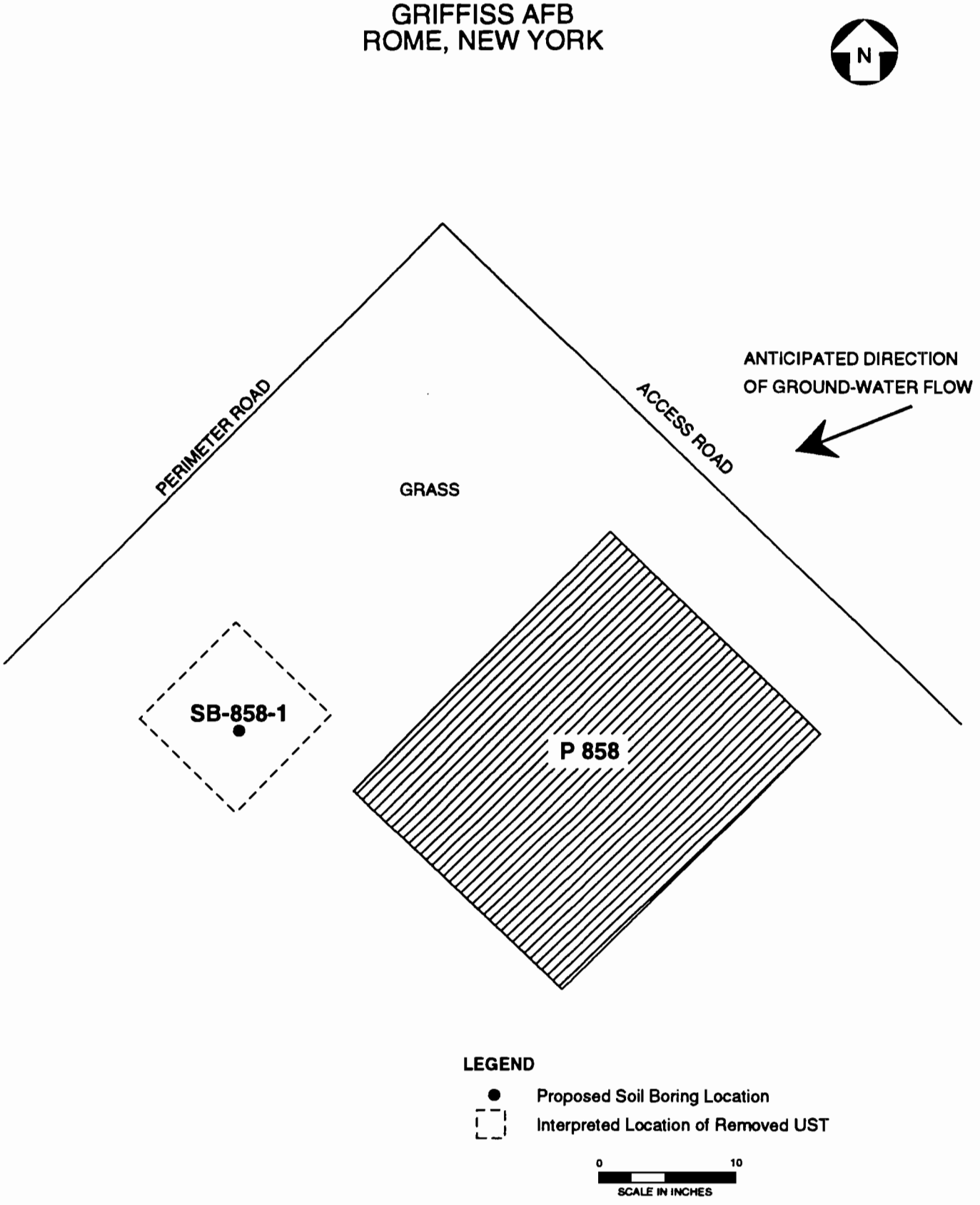


FIGURE DERIVED FROM SITE VISIT AND GAFB DRAWINGS

2588-0203.01

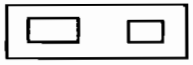
FIGURE 2-19

PROPOSED SOIL BORING LOCATION
BUILDING 6314

GRIFFISS AFB
ROME, NEW YORK

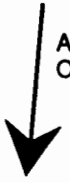
CONCRETE APRON

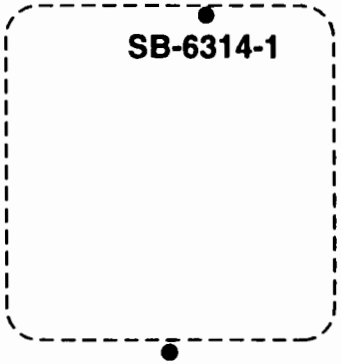
ABANDONED
FUEL DISPENSER
ISLAND



GRASS

ANTICIPATED DIRECTION
OF GROUND-WATER FLOW





CONCRETE PAD

LEGEND

- ● Proposed Soil Boring Location
- ⬚ Interpreted Location of Removed UST

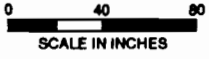


FIGURE DERIVED FROM SITE VISIT

2588-0203.01

3.0 FIELD OPERATIONS PROGRAM

The following sections describe the field sampling program to be conducted at the twenty UST sites. These activities include field preparation activities, advancement of soil test borings, sampling of soils from 28 borings for geotechnical and chemical analyses, sampling of ground water for chemical analyses from monitoring wells and installation of monitoring wells, well development and in-situ permeability testing.

3.1 PREPARATION FOR FIELD SAMPLING

The standard procedures for preparation for field activities presented in the RI Planning Documents (Vol. IIB, FSP, Section 6.0) will be implemented prior to the start of work at the UST sites. Although most of the UST sites are not in a restricted security access area, the following exceptions are noted:

- UST sites at Buildings 842, 846, 814 and 830 are located at or near the Weapons Storage Area, a high security area;
- UST sites at Building 858 and Tank 6314 are located on the flight line; and
- UST site 745 is located at "Alert Apron" No. 1.

Base security police will be notified and escorts will be arranged through the base whenever contractors are required to access these work areas. A minimum of two weeks notice will be provided to Griffiss AFB Environmental Management Flight personnel to allow for the coordination of security clearance activities. In order to drill soil borings for the UST sites at Buildings 9 and 846, concrete cutting and/or coring activities will be performed. The UST at Building 9 is embedded in concrete (in part of the foundation). The UST at Building 846 is covered by a concrete apron.

If the geophysical surveys reveal evidence of concrete obstructions that will interfere with drilling activities at the other UST sties, additional concrete cutting and/or coring activities may be necessary.

3.2 SITE RECONNAISSANCE

The general rationale for conducting a preliminary site reconnaissance is described in the RI Planning Documents (Vol. IIB, FSP, Section 6.1) (Law, 1993a). A visual site reconnaissance was conducted by Law at the UST sites

from July 12 through 14, 1993. Based on this reconnaissance, it was determined that the areas of investigation at the UST sites are generally accessible. However, there may be overhead and underground utilities located near some of the proposed sampling locations.

3.3 FIELD INVESTIGATION

The following field investigation activities will be conducted at the UST sites:

- Conduct a geophysical survey of each UST site to evaluate the site with respect to drilling hazards and confirm whether tanks are present at the sites.

- Drill a total of 28 deep soil borings to five feet below the ground-water surface encountered at the time of boring. Borings will be located in anticipated downgradient locations with respect to each tank site.

- Collect soil samples continuously for geologic classification, head space screening and geotechnical analysis from the top of the known or estimated tank elevation to five feet below the ground-water table. Submit two field soil samples from each boring for chemical analyses, based on the results of headspace screening, and submit one sample from each monitoring well boring for geotechnical analyses.

- Install and develop monitoring wells at tank sites showing observable signs of soil contamination or where contamination is known to have occurred, including Buildings 428, 745, and 846, with a minimum of one monitoring well per site (additional monitoring wells will be installed in areas of suspected contamination, based on visual contamination, headspace screening and chemical analysis of the soil samples). The locations of all monitoring wells will be approved by the U.S. Army Corps of Engineers (USACE) prior to installation.

- Conduct in-situ permeability testing of each monitoring well.

- Collect one ground-water sample from each well.

- Perform survey of boring and well locations.

The locations and procedures for sample collection are described in the following subsections.

3.3.1 Geophysical Surveys

Geophysical surveys provide a non-intrusive method for the evaluation of subsurface conditions at a site. They have been employed to assess hydrogeologic conditions, detect and map contaminants and delineate buried wastes, utilities, tanks and other subsurface features. The surface geophysical methods described are generally used as reconnaissance tools to cover an area rapidly and focus on problem areas.

Geophysical surveys will be performed at the UST sites prior to intrusive activities to detect buried items that may pose a hazard to drilling operations and to identify subsurface anomalies (i.e., USTs, underground utilities). The geophysical survey results will be used to field locate and flag areas to be avoided during drilling. Because the sole purpose of the survey is to identify field hazards, a formal report presenting the geophysical survey results will not be prepared; however, the data gathered will be used in the identification of site features during the reporting phase of this project. The geophysical methods to be employed are described below.

3.3.1.1 Electromagnetic Conductivity - Electromagnetic (EM) conductivity surveys provide a rapid means of measuring electrical conductivity. Shallow EM conductivity surveys will be employed to locate buried metallic tanks and appurtenances, and metallic utility lines. An EM-31/EM-61 will be used to conduct the survey at each UST site, and the data gathered will be used to identify locations to be avoided during drilling.

3.3.1.2 Pipe and Cable Locator - The pipe and cable locator detects the conductivity of metallic objects and will be used on exposed metallic objects, i.e., vent caps. The locators will be employed to detect buried tanks and appurtenances, and utility lines. The information will be used to identify locations to be avoided during drilling.

3.3.1.3 Ground-Penetrating Radar - The ground-penetrating radar (GPR) method provides a subsurface profile of the area of interest. The depth of buried items may be calculated from the information obtained. The GPR will be used in the event that the EM and the pipe and cable locator do not reveal data used to identify locations to be avoided during drilling.

At sites in which the soil boring is located near an existing tank, as confirmed by the geophysical survey, a hand auger boring to the depth of the top of the tank may be performed to confirm the tank location prior to the start of drilling. The tops of existing tanks are reported by the base to be 24 to 36 inches below ground surface.

3.3.2 Drilling Methods and Documentation

Soil borings and monitoring well borings will be advanced using a drill rig equipped with hollow-stem augers to an estimated depth of 15 to 25 feet. Drilling procedures and the associated documentation (i.e., drilling logs) are described in the RI Planning Documents (Vol. IIB, FSP, Section 11.1) (Law, 1993a). Hand augering will be performed to a depth of approximately 15 feet, if overhead utilities obstruct drilling activities.

3.3.3 Deep Soil Borings

Deep soil borings will be drilled to a depth of five feet below the ground-water table to evaluate the subsurface soil conditions at each site. All borings will be conducted as specified in the RI Planning Documents (Volume IIB, FSP, Section 11.1) (Law, 1993a). The borings will be located at the anticipated downgradient location based on existing ground-water flow direction information and will be uniquely designated in accordance with the procedures for identifying sample locations presented in the RI Planning Documents (Vol. IIA, QAPP, Section 5.3) (Law, 1993a). For tanks which were 1,000-gallon capacity or less, one soil boring will be performed; for tanks which were over 1,000-gallon capacity, two soil borings will be performed.

Table 3-1 summarizes the number of soil borings planned for each UST site. The locations of proposed borings are shown on Figures 2-2 through 2-19. If boring locations are offset to avoid drilling hazards, the new locations selected will be as close as possible to the original locations indicated.

3.3.4 Samples for Visual Classification

A geologic description of the penetrated interval will be recorded by the Site Geologist using the USACE Hazardous and Toxic Waste Drilling Log presented in the RI Planning Documents (Vol. IIB, FSP, Section 11.1) (Law, 1993a). Soil samples will be collected from the elevation of the top of tank to a depth of 5 feet below ground-water table. Soil classification will be performed in accordance with the Unified Soil Classification System (ASTM S2488-89) described in the RI Planning Documents (Vol. IIB, FSP, Section 11.1) (Law, 1993a).

3.3.5 Monitoring Well Installation

A minimum of four monitoring wells will be installed during this project. One well each will be installed at Buildings 428, 745 and 846 (Figures 2-11, 2-12, and 2-17). Additional wells will be installed based on the results

TABLE 3-1

SUMMARY OF SOIL BORINGS TO BE PERFORMED AT EACH UST SITE
Griffiss Air Force Base, Rome, New York

LOCATION	TANK CAPACITY (gallons)	NUMBER OF BORINGS
9	250	1
44	110	1
101	12,000	2
123	300	1
137	275	1
214	275	1
255	500	1
305	550	1
337	4,000	2
428	2,000; 550; 7,500	5
745	1,200	2
802	275	1
814	275	1
830	275	1
842	5,000	2
846	1,500	2
858	275	1
6314	2,000	2
	TOTAL:	28

of the field screening, visual indicators of contamination (i.e., stained soils, visible product) evident at the time of boring advancement, and chemical analysis of the soil samples. The locations of all wells will be approved by the USACE prior to installation.

3.3.6 Monitoring Well Construction

The construction methods and materials to construct the monitoring well are specified in the RI Planning Documents (Vol. IIB, FSP, Section 11.2) (Law, 1993a). The diameter of polyvinyl chloride (PVC) riser and screen to be used for monitoring wells will be a minimum of two inches, and a 10-foot long section of 0.010 machine slot Schedule 40 PVC screen will be used in each well to screen the upper water table aquifer.

A filter pack will be installed in the annular space between the boring and the well screen. The sand size for the filter pack design will be derived from data obtained from wells previously installed at Griffiss AFB and the availability of appropriately sized material in the area. Based on geotechnical data from these wells, a filter pack will be selected following the methods prescribed in ASTM D 5092-90 and the EPA "Handbook of Suggested Practices for Design and Installation of Ground-Water Monitoring Wells" (Vol. IIB, FSP, Section 11.3) (Law, 1993).

The riser pipe will extend above the ground surface approximately 18 to 24 inches. Depending on site conditions, the well will be finished at the surface with a steel security casing extending 24 to 30 inches above ground surface and/or with a flush mount steel monitoring well vault. A schematic diagram of a shallow monitoring well is presented in the RI Planning Documents (Vol. IIB, FSP, Section 11.3) (Law, 1993a).

3.3.7 Samples for Geotechnical Analyses

Two soil samples from each monitoring well boring will be submitted to the laboratory for geotechnical analyses. These samples will be chosen based on stratigraphic location and hydrological significance. These samples will be identified by a unique identifier in accordance with the procedures for identifying sample locations as described in the RI Planning Documents (Vol. IIA, QAPP, Section 5.3) (Law, 1993a). An appropriate alphabetical suffix for the actual depth sampled will be indicated at the time of sample collection. One sample will be submitted from the screened interval in each well, and one from the unsaturated zone based on stratigraphic and hydrogeological significance.

3.3.8 Well Development

Monitoring well development will be performed as specified in the RI Planning Documents (Vol. IIB, FSP, Section 11.4) (Law, 1993a). Monitoring wells will not be developed if free product is found to be present.

3.3.9 In-Situ Permeability Testing

In-situ permeability testing will be performed as specified in the RI Planning Documents (Vol. IIB, FSP, Section 11.5) (Law, 1993a). Upon the completion of in-situ permeability and prior to sampling, a dedicated bladder pump will be installed in each well for sampling. The appropriate design for the bladder pump installation (pump size and tubing lengths) will be determined on a well-specific basis after well completion.

3.4 ENVIRONMENTAL SAMPLE COLLECTION

The following sections describe the locations and depth intervals from which samples will be collected for chemical analyses. The appropriate records will accompany the samples from collection to delivery to the laboratory as described in the RI Planning Documents (Volume IIA, QAPP, Section 6.0) (Law, 1993a).

3.4.1 Soil Samples

Two samples will be submitted for chemical analysis for each boring. Soil samples will be collected from the soil test borings conducted at each site. A summary of the samples to be submitted for chemical analyses is presented in Table 6-1, Section 6.0. Samples will be collected from 2-foot depth intervals in each boring and headspace screening will be conducted to select samples for chemical analysis. The headspace screening will be performed as described in Section 11.1 of the FSP (Volume IIB) (Law, 1993a). Soil samples with the highest headspace reading from the known or estimated top of the UST will be submitted for chemical analysis. In addition, soil samples collected at a depth of 5 feet below the ground-water table will be submitted for chemical analysis. The soil samples will be designated with unique identifiers as explained in Section 5.2.1 of this FOP.

3.4.2 Ground-Water Samples

Four ground-water samples will be collected for chemical analyses, one from each installed well. The ground-water samples will be collected using the dedicated stainless steel bladder pumps and tubing installed in each well as

specified in the RI Planning Documents (Vol. IIB, FSP, Section 12.7). The ground-water samples will be identified as described in Section 5.2.2 of this FOP.

3.4.3 QA/QC Samples

The Quality Assurance/Quality Control (QA/QC) sample frequency of sample collection is discussed in the RI Planning Documents (Vol. IIA, QAPP, Section 10.1) (Law, 1993a). The QA/QC samples to be collected for this project are presented in Section 6.0 of this FOP.

3.4.4 Monitoring Well and Soil Boring Location Survey

All soil borings will be staked at completion to facilitate subsequent surveying. The location of the borehole or well will be determined to the nearest 0.1 foot and elevation of the borehole will be determined to the nearest 0.01 foot. The location of each borehole will be measured from permanent site features which will allow for later relocation of all sampling locations. These measurements will be shown on a site plan and recorded in the surveying notebook.

Coordinates will be established for each borehole and well location. The coordinates will be to the closest 0.1 foot and referenced to the New York State (NYS) Plane Coordinate System. If the NYS Plane Coordinate System is not readily available, an existing local grid system will be used. Two permanent control monuments will be placed in accessible locations within the limits of the Base. One set of monuments will be allowed for selected UST sites. These monuments will be set no closer than 500 feet to each other. Coordinates and elevations for each monument will be established to the closest 0.01 foot. The location, identification, coordinates, and elevations of the wells and monuments will be plotted on maps with a scale large enough to show their locations. A tabulated list of the borehole locations, monuments, copies of all field books, and all computation sheets will be prepared. The tabulation will consist of the designated number of the borehole or monument, the X and Y coordinates, and all the required elevations.

3.5 FIELD OPERATIONS SUMMARY

Table 3-2 summarizes the field tasks to be performed for this project.

TABLE 3-2

RATIONALE FOR SITE INVESTIGATION FIELD TASKS
UST Site Assessments
Griffiss Air Force Base, Rome, New York

UST SITES		FIELD INVESTIGATION TASK	RATIONALE
Building 9	Building 745	1. Site reconnaissance.	1. All sites will be inspected to identify access routes, overhead, surface and potential subsurface obstructions, and to verify the location of existing underground storage tanks.
Building 44	Building 802		
Building 101	Building 814		
Building 123	Building 830		
Building 137	Building 842	2. Collect two soil samples from each soil boring for chemical analysis.	2. Determine the presence of soil contamination at each UST. Evaluate ecological impact and risk to human health.
Building 214	Building 846		
Building 255	Building 858		
Building 305	Building 6314		
Building 337		3. Install monitoring wells. A total of four wells are planned. Collect one sample from each monitoring well boring for geotechnical analyses.	3. Evaluate the nature and levels of ground-water contamination at sites of known contaminants. Confirm visual classification of soils.
Building 367			
Building 428			
		4. Collect one ground-water sample from each monitoring well installed.	4. Determine the nature and extent of ground-water contamination. Evaluate risk posed by ground-water exposure pathway.
		5. Conduct in-situ permeability testing at each monitoring well.	5. Evaluate hydraulic conductivity of screened aquifer.
		6. Survey monitoring well and soil boring locations.	6. Establish locations of monitoring wells and soil borings.

3.6 INVESTIGATION-DERIVED WASTE MANAGEMENT

Five categories of investigation-derived wastes (IDWs) requiring management are anticipated during the site assessments: (1) soil cuttings from test borings and borings drilled for monitoring well installation; (2) development water from monitoring well development activities; (3) purge water from monitoring well sampling activities; (4) decontamination fluids resulting from steam cleaning of heavy equipment and from decontamination of sampling equipment and site personnel; (5) miscellaneous waste, consisting of items such as disposable supply containers and used personal protective clothing (i.e., Tyvek coveralls, boot covers, gloves, respirator cartridges). Law does not accept title to any solid or hazardous wastes generated during any site assessment activity to be conducted at Griffiss AFB. Table 3-3 depicts the scenarios for IDW management in this project. The approaches to managing these categories of waste are described below.

3.6.1 Soil Cuttings from Test Borings and Monitoring Well Installation

Soil cuttings from test borings and monitoring well installation will be placed into open-top, Department of Transportation (DOT) 17H drums (or the equivalent) and the drums will be labelled as specified in the RI Planning Documents (Vol. IIB, FSP, Section 21.4) and transported as described below. All drums generated will be annotated on a drum log to be maintained by the Site Manager. A copy of the drum log will be provided to the Griffiss AFB Environmental Coordinator upon completion of the field effort.

A waste management subcontractor will move the drums from the site of generation to the on-base staging area designated by the Griffiss AFB Environmental Management Flight after sampling. Representative samples of soil cuttings from the wastes generated will be collected at the staging area for waste characterization purposes in accordance with the requirements specified in 6NYCRR Part 371, Section 371.3 and the NYSDEC in its guidance document "Petroleum-Contaminated Soil Guidance Policy" (NYSDEC, 1992). The drums will be managed in the staging area by Griffiss AFB pending the receipt of the results of waste disposal characterization testing. Upon the receipt of analytical results a determination will be made regarding the appropriate method of disposal of the soils. Law will subcontract for the sampling, characterization, transportation and disposal of the soils at an appropriate disposal facility if the soil cuttings exceed the soil cleanup guidelines specified in 6 NYCRR Part 371, Section 371.3 and the NYSDEC guidance document "Petroleum Contaminated Soil Guidance Policy" (NYSDEC, 1992). If the soil cuttings do not exceed these guidelines, it will be assumed that the soil cuttings will be managed on base. Law will provide oversight of the subcontractor(s) when performing on-base waste management activities. Griffiss AFB will be responsible for the completion of all manifests for off-base transportation and waste disposal.

TABLE 3-3

MANAGEMENT OF INVESTIGATION DERIVED WASTE
Griffiss Air Force Base
Rome, New York

		Water Category		
		Aqueous		
Site	Soil	Development/Purge Water	Decontamination Water	Other (i.e., PPE)
9	STARS (concrete)	Well	POTW	SWCP
44	STARS	Well	POTW	SWCP
101	STARS	Well	POTW	SWCP
123	STARS	Well	POTW	SWCP
137	STARS	Well	POTW	SWCP
214	STARS	Well	POTW	SWCP
255	STARS (asphalt)	POTW	POTW	SWCP
305	STARS	Well	POTW	SWCP
337	STARS	Well	POTW	SWCP
428	STARS	Well	POTW	SWCP
745	STARS	Well	POTW	SWCP
802	STARS	Well	POTW	SWCP
814	STARS	Well	POTW	SWCP
830	STARS	Well	POTW	SWCP
842	STARS	Well	POTW	SWCP
846	STARS (concrete)	POTW	POTW	SWCP
858	STARS	Well	POTW	SWCP
6314	STARS	Well	POTW	SWCP

NOTES:

STARS = August 1992 NYS DEC Guidance Policy intended to provide direction on the handling, disposal and/or reuse of petroleum-contaminated soil.
SWCP = Solid waste collection point on the Base, i.e., dumpster.
POTW = Discharge to Rome, New York Publicly Owned Treatment Works, if approved by the City of Rome Water Pollution Control Facility.
Well = Discharge adjacent to well, if runoff can be controlled. If runoff cannot be controlled, POTW discharge will be requested.

3.6.2 Monitoring Well Development Water and Purge Water

At sites where runoff from the site can be controlled, water from monitoring well development and purging will be discharged to the ground surface, adjacent to the well, and allowed to percolate into the on-site soils. In the event that site runoff cannot be controlled (i.e., at paved sites) the aqueous waste produced during site activities will be drummed in closed-top DOT 17H drums (or the equivalent), inventoried, labeled as specified in the RI Planning Documents (Vol, IIB, FSP, Section 21.4) and transported to the on-base staging area designated by the Griffiss AFB Environmental Management Flight. Disposal will be determined by the levels of target analytes and discharge parameters required by the City of Rome Publicly-Owned Treatment Works (POTW). If the levels of the target analytes meet the POTW acceptability criteria, and the POTW provides written authorization to discharge to its facility, the waste fluids will be transported to the POTW. If the POTW limits are exceeded, Law will pursue off-site disposal of this waste. Law will provide oversight of the subcontractor(s) when performing on-base waste management activities. Griffiss AFB will be responsible for the completion of all manifests for off-base transportation and waste disposal.

3.6.3 Decontamination Water

Griffiss AFB will designate a location for equipment decontamination prior to the start of field work. Decontamination fluids from steam cleaning, sampling equipment decontamination and personal decontamination will be collected in a sump or appropriate containers and will be periodically pumped or poured into DOT 17H drums (or the equivalent). The drums will be inventoried, labeled as specified in the RI Planning Documents (Vol, IIB, FSP, Section 21.4) (Law, 1993a) and then transported to the drum staging area on base. If the levels of the target analytes meet the base's allowable limits for discharge to the POTW facility off-base, and the POTW provides authorization to discharge to the facility, the decontamination fluids will be transported and discharged into a POTW sampling point on base. If the POTW limits are exceeded, Law will pursue off-site disposal of this waste. Law will provide oversight of the subcontractor(s) when performing on-base waste management activities. Griffiss AFB will be responsible for the completion of all manifests for off-base transportation and waste disposal.

3.6.4 Other Wastes

A container will be provided at the site, during work, in the decontamination area for the collection of miscellaneous wastes resulting from site activities such as gloves, personal protective clothing and equipment (PPE), disposable

supply containers, and other disposables used in drilling and sampling operations. The wastes collected will be placed at a Griffiss AFB designated solid waste collection point (i.e., trash dumpster) at the completion of work each day for disposal.

4.0 SITE-SPECIFIC HEALTH AND SAFETY

This section of the FOP presents the site-specific hazards (chemical, physical and biological), initial and contingency upgrade personal protective equipment (PPE) to be used at the site, chemical indicators of hazard to be monitored for during site activities, the details of the monitoring program, action levels for PPE upgrade based on monitoring, decontamination and emergency contingency procedures to be implemented during site activities. The Site Safety Officer (SSO) will be responsible for the implementation of the program outlined in this section and the general operating procedures described in the HSP.

4.1 SAFETY MEETINGS

A site safety meeting with all site personnel will be held prior to the onset of field activities and once a week thereafter. The purpose of the meetings will be to discuss the potential health and safety hazards associated with field activities, and to ensure that standard operating procedures are followed at all times.

4.2 CONTAMINANT CHARACTERIZATION

Petroleum products from diesel fuel, fuel oil, gasoline, jet fuel, AVGAS, and heavy metals are the primary constituents of concern at this site. Table 4-1 presents the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits, Time Weighted Average (OSHA PEL-TWA), American Conference of Government Industrial Hygienists Threshold Limit Values (ACGIH TLVs), odor threshold, ionization potential, and symptoms of exposure for constituents of concern.

4.3 TASK-SPECIFIC HAZARDS

A description of anticipated potential hazards and an evaluation of these hazards is presented in the following subsections.

TABLE 4-1

IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
CLASS: PETROLEUM FUEL CONSTITUENTS								
Benzene	1 5 [ST]	10 [A2]	3000	7.9/1.3	4.68	73	9.24	Acute: Irritation of eyes, nose, or respiratory system, giddiness, headache, nausea, staggered gait, fatigue, anorexia, lassitude, dermatitis Chronic: Bone marrow depression, carcinogen
Ethyl benzene	100 125 [ST]	100 125 [ST]	2000	6.7/1.0	2.3	84	8.76	Acute: Irritation of eyes, mucous membrane, headache, dermatitis, narcosis, coma Chronic: Liver and kidney damage
Naphthalene	10 15 [ST]	10	500	5.9/0.9	0.084	NA	8.12	Acute: Eye and skin irritant, nausea, vomiting, headache, confusion, sweating, abdominal pain, jaundice, kidney damage Chronic: Kidney damage, cataracts
Toluene	100 150 [ST]	50	2000	7.1/1.2	2.9	94	8.82	Acute: Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, paresthesia, dermatitis Chronic: CNS effects, brain dysfunction, liver and kidney damage

NOTES:
- B : Time to reach 1% breakthrough (tested at 1000 ppm, 50% relative humidity, 22°C, and 53 L/min)
- C : Ceiling limit
- ST : Short-term exposure limit
- skin : Recognized as having potential for dermal absorption
- A2 : Suspected human carcinogen (ACGIH)
- Ca : Carcinogen (NIOSH)
- NC : Noncombustible solid or liquid
- FMP : 5 minute maximum peak in any two hours
- CP : Combustible in dust or powdered form
- NE : No evidence found for the existence of an IDLH (NIOSH)
- NA : Not Available
- ND/NR : Not relevant
- Ukn : Unknown
- VA : Varies according to compound
- * : Noncombustible liquid; however the vapor will burn
- ** : Noncombustible liquid at ordinary temperatures, but the gaseous form will ignite and burn weakly at 1256° F
- *** : H_2S strong odor, noticeable at low concentrations, is a poor warning sign as it may cause olfactory paralysis; some persons are congenitally unable to smell H_2S.
- NCRP : National Council on Radiation Protection

REFERENCES: ACGIH, Threshold Limit Values, 1991-1992.
NIOSH, Pocket Guide to Chemical Hazards, 1990.
OSHA, Permissible Exposure Limits, 29 CFR 1910.1000.
Sittig, Hazardous and Toxic Effects of Industrial Chemicals, 1979.
ATSDR, Toxicological Profiles for Constituents, 1987-1991.

(a) Chlorodiphenyl (42% chlorine) (PCB 1242)
(b) Chlorodiphenyl (54% chlorine) (PCB 1254)

TABLE 4-1

IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
Xylene (o-,m-,p-isomers)	100 150 [ST]	100 150 [ST]	1000	7.0/ 1.1 (o) 1.0 (m) 1.1 (p)	1.1	NA (o) 99 (m) NA (p)	8.56 (o) 8.54 (m) 8.44 (p)	Acute: Dizziness, excitement, drowsiness, incoordination, staggering gait, irritation of eyes, nose, or throat, eye disorders, anorexia, nausea, vomiting, abdominal pain, dermatitis Chronic: Lung and liver effects
Total Petroleum Hydrocarbons (as gasoline)	300 500 [ST]	300 500 [ST]	NA	NA/NA	0.25	NR	NR	Acute: Irritation of upper respiratory tract, depression of central nervous system, irregular heartbeat, irritation of mucous membrane Chronic: Ukn
CLASS: METALS/INORGANICS								
Aluminum (dust)	15 mg/m³	10 mg/m³	NE	NC/NC	ND	NR	NR	Acute: Dermatitis, eczema, conjunctivitis, mucus membrane/upper respiratory irritation Chronic: Pneumoconiosis, Alzheimer's disease, dialysis dementia
Antimony	0.5 mg/m³	0.5 mg/m³	80 mg/m³	NA/NA	ND	NR	NA	Acute: Skin and eye irritant, nausea, vomiting, death after large oral doses Chronic: Pulmonary edema, EKG changes, red blood cell changes, hypertension

NOTES:
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- A2 : Suspected human carcinogen (ACGIH)
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- NA : Not Available
- ND/NR : Not relevant
- Ukn : Unknown
- VA : Varies according to compound
- * : Noncombustible liquid; however the vapor will burn
- ** : Noncombustible liquid at ordinary temperatures, but the gaseous form will ignite and burn weakly at 1256° F
- *** : H_2S strong odor, noticeable at low concentrations, is a poor warning sign as it may cause olfactory paralysis; some persons are congenitally unable to smell H_2S.
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REFERENCES: ACGIH, Threshold Limit Values, 1991-1992.
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(a) Chlorodiphenyl (42% chlorine) (PCB 1242)
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TABLE 4-1

IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
Arsenic	0.01 mg/m³ [Ca]	0.2 mg/m³ [Ca]	100 mg/m³	CP/CP	ND	NR	NR	Acute: Nasal septum ulceration, dermatitis, respiratory irritation, GI disturbances Chronic: Peripheral neuritis, hyperpigmentation of skin, carcinogen
Barium (soluble compounds)	0.5 mg/m³	0.5 mg/m³	1100 mg/m³	NC/NC	ND	NR	NR	Acute: Upper respiratory tract irritation, gastroenteritis, muscle spasms, slow pulse, extrasystoles, hypokalemia, eye and skin irritant, skin burns Chronic: Hypertension
Beryllium	0.002 mg/m³ 0.005 mg/m³ [C]	0.002 mg/m³ [A2]	10 mg/m³	CP/CP	ND	NR	NR	Acute: Respiratory symptoms, weakness, fatigue, weight loss Chronic: Pneumonitis, berylliosis, carcinogen
Cadmium	0.2 mg/m³ 0.6 mg/m³ [C] [Ca]	0.05 mg/m³	50 mg/m³	NC/NC	ND	NR	NR	Acute: Pulmonary edema, dyspnea, cough, tight chest, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea Chronic: Lung fibrosis, emphysema, proteinuria, mild anemia, carcinogen

NOTES:
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- skin : Recognized as having potential for dermal absorption
- A2 : Suspected human carcinogen (ACGIH)
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TABLE 4-1

IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
Chromium	1 mg/m³	0.5 mg/m³	NE	NC/NC	ND	NR	NR	Acute: Sneezing, throat irritation, bronchial spasm, skin ulcers, GI irritation, nausea, vomiting, severe diarrhea, hemorrhage (oral form) Chronic: Nasal perforation, chronic inflammation of respiratory tract, lung cancer
Copper (dusts)	1 mg/m³	1 mg/m³	NE	CP/CP	ND	NR	NR	Acute: Irritation of mucous membranes in nose and pharynx, nasal perforation, eye irritation, metallic taste, dermatitis, metal fume fever Chronic: NA
Iron	10 mg/m³	1 mg/m³	NE	NC/NC	ND	NR	NR	Acute: Oral-GI distress, liver damage Chronic: Benign pneumoconiosis
Lead	0.05 mg/m³	0.15 mg/m³	700 mg/m³	NC/NC	ND	NR	NR	Acute: Weakness, lassitude, insomnolence, facial pallor, anorexia, low weight, constipation, abdominal pain, colic, anemia, irritation of eyes, hypotension Chronic: Malnutrition, gingival lead line, tremor, paralysis of wrist or ankles, brain disorder, nerve disorder
Manganese, dust and compounds	5 mg/m³ [C]	5 mg/m³	NE	NA/NA	ND	NR	NR	Acute: Lung irritation, cough Chronic: Manganism (neurological disease), symptoms are weakness, lethargy, speech disturbances, clumsy gait, hallucinations, psychosis, muscle rigidity

NOTES:
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- C : Ceiling limit
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- skin : Recognized as having potential for dermal absorption
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- Ca : Carcinogen (NIOSH)
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IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
Mercury (compounds)	0.01 mg/m³ 0.03 mg/m³ [ST] [skin]	0.01 mg/m³ 0.03 mg/m³ [ST] [skin]	10 mg/m³	NR/NR	ND	NR	NR	Acute: Incoordination, vision, hearing disturbance, spastic, jerky, dizziness, salvation, lacrimation, nausea, vomiting, diarrhea, constipation, skin burns, emotional distress Chronic: In animals: decreased weight gain, kidney damage
Nickel (dust and compounds)	0.1 mg/m³ (sol) 1 mg/m³ (insol)	0.1 mg/m³ (sol) 1 mg/m³ (insol)	NA	NC/NC	ND	NR	NR	Acute: Headache, vertigo, nausea, vomiting, gastric pain, substernal pain, cough, cyanosis, weakness, leukocytosis, delirium, convulsion Chronic: Lung lesions, asthmatic disease, immune system changes, lung and nasal cancers
Selenium, and compounds	0.2 mg/m³	0.2 mg/m³	Ukn	NA/NA	ND	NR	NA	Acute: Lung and eye irritation, pallor, irritability, giddiness, GI effects Chronic: Pulmonary edema, possible liver and kidney damage
Strontium	NA	NA	NA	NA/NA	ND	NR	NA	Acute: Oral-arrhythmias, cardiac arrest, concentration in bone tissue Chronic: Bone cancer
Silver (dust and compounds)	0.01 mg/m³	0.1 mg/m³ (dust) 0.01 mg/m³ (sol)	NA	NC/NC	ND	NR	NR	Acute: Blue-gray eyes, nasal septum, throat, skin, irritation of skin or ulceration, gastrointestinal disturbance Chronic: Ukn

NOTES:
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- ST : Short-term exposure limit
- skin : Recognized as having potential for dermal absorption
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- Ca : Carcinogen (NIOSH)
- NC : Noncombustible solid or liquid
- FMP : 5 minute maximum peak in any two hours
- CP : Combustible in dust or powdered form
- NE : No evidence found for the existence of an IDLH (NIOSH)
- NA : Not Available
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(b) Chlorodiphenyl (54% chlorine) (PCB 1254)

TABLE 4-1

IMPORTANT PROPERTIES OF CONSTITUENTS OF CONCERN AT GRIFFISS AFB
UST Sites
Griffiss AFB, Rome, NY

Constituent	OSHA PEL (ppm)	ACGIH TLV (ppm)	IDLH (ppm)	UEL (%)/ LEL (%)	Odor Threshold (ppm)	Respirator Cartridge Breakthrough Time (min)[B]	Ionization Potential (eV)	Health Hazards (Acute/Chronic)
Vanadium (dust)	0.05 mg/m^3	0.05 mg/m^3	70 mg/m^3	NC/NC	ND	NR	NR	Acute: Eye irritation, green tongue, metallic taste, eczema, cough, fine rales, wheezing, bronchitis, dyspnea, throat irritation Chronic: Possible CNS effects
Polychlorinated Biphenyl Compounds	1 mg/m^3 (a)	1 mg/m^3 (a)	Ca 10 mg/m^3	NA/NA	ND	NR	NR	Acute: Eye irritation, chloracne, liver damage Chronic: Cancer of liver
	0.5 mg/m^3 (b)	0.5 mg/m^3 (b)	Ca 5 mg/m^3	NA/NA	ND	NR	NR	Acute: Eye and skin irritation, acne-form of dermatitis, liver damage Chronic: Skin cancer
Zinc (as ZnO dust)	10 mg/m^3 (total) 5 mg/m^3 (respirable)	10 mg/m^3	NA	NA/NA	ND	NR	NR	Acute: Metal fume fever, GI distress Chronic: Alveolar tissue damage

NOTES:
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- C : Ceiling limit
- ST : Short-term exposure limit
- skin : Recognized as having potential for dermal absorption
- A2 : Suspected human carcinogen (ACGIH)
- Ca : Carcinogen (NIOSH)
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(a) Chlorodiphenyl (42% chlorine) (PCB 1242)
(b) Chlorodiphenyl (54% chlorine) (PCB 1254)

4.3.1 Potential Hazards

Potential hazards that may be associated with field activities at this site include the following:

- Personnel exposure to organic and inorganic chemicals via inhalation, incidental ingestion of soils, and/or skin contact with contaminated media
- Explosion and/or flammability of contaminants
- Biological hazards (snakes, mosquitoes, ticks)
- Heat or cold stress, depending on season
- Excessive noise level from aircraft or drilling equipment
- Physical hazards associated with working in the vicinity of heavy equipment

4.3.2 Hazard Evaluation

The intrusive activities involved will increase the potential for exposure to hazardous materials via contaminated soil, ground-water, or bulk material contact. These activities include the following:

- Soil boring advancement
- Soil sampling
- Ground-water sampling
- Monitoring well installation
- Monitoring well development
- In-situ permeability testing

Non-intrusive activities are anticipated to have a lower or non-existent potential for exposure to hazards because, unlike the intrusive activities listed above, there will be little or no contact with contaminated media.

Requirements for personal protection equipment and safety protocols during these field activities are discussed in the RI Planning Documents (Vol. IV, HSP, Sections 7.0 and 11.0) (Law, 1993a) and in Sections 4.5 and 4.6 of this FOP.

4.4 CHEMICAL INDICATORS OF HAZARD

Chemical indicators of hazard were selected from the primary constituents of concern at the site based on toxic and hazardous properties. The chemicals that have the greatest potential to cause adverse health effects at the lowest concentrations were selected as indicators in order to establish the most protective action level guidelines during field investigations. Exposure monitoring for the presence of these chemicals will be conducted during all intrusive investigative activities at this site.

Action guidelines for each chemical have been established based on regulatory or guideline exposure limits, or on toxic properties (where exposure limits are not available). These action guidelines should protect workers from the other constituents anticipated to be encountered at the site.

The parameters selected to serve as the indicators of hazard at this site are:

- Benzene
- Toluene

4.5 PERSONNEL PROTECTIVE EQUIPMENT

The equipment required for four levels of personal protection (Levels B through D and Modified Level D) are described in the RI Planning Documents (Vol. IV, HSP, Section 7.1) (Law, 1993a).

Level D protection will be used initially during non-intrusive field activities. Modified Level D will be used initially during intrusive field activities covered by this plan. PPE will be upgraded to Level C and/or Level B PPE, if warranted by the monitoring of site conditions during work activities. PPE upgrading will be determined by the action levels for the monitoring equipment described in Section 4.6 of this FOP.

4.6 PERSONNEL MONITORING

Table 4-2 lists the monitoring equipment, tasks, and action guidelines to be used when measuring explosive gases, oxygen and organic vapors during site activities. Explosive gas and oxygen levels will be measured at the tops of boreholes, and organic vapors will be monitored in the breathing zone of the worker nearest to the borehole during intrusive activities. Table 4-3 presents the criteria for upgrading or downgrading PPE based on the results of monitoring for the chemical indicators of hazard identified.

TABLE 4-2

FIELD INVESTIGATION ACTIVITIES
UST Sites
Griffiss AFB, Rome, NY

TASKS TO BE PERFORMED	TYPE OF ACTIVITY	MONITORING EQUIPMENT
Soil Borings	Intrusive	Combustible Gas Indicator Oxygen Meter PID/Draeger Tubes
Soil Sampling	Intrusive	Combustible Gas Indicator Oxygen Meter PID/Draeger Tubes
Ground-Water Sampling	Intrusive	Combustible Gas Indicator Oxygen Meter PID/Draeger Tubes
Monitoring Well Installation	Intrusive	Combustible Gas Indicator Oxygen Meter PID/Draeger Tubes
Monitoring Well Development and In-Situ Permeability Testing	Intrusive	Combustible Gas Indicator Oxygen Meter PID/Draeger Tubes

NOTES:

PID = Photoionization Detector

Draeger Tube Specifications: Benzene 0.5/a; standard range of measurement 0.5 to 10 parts per million (ppm) benzene
Benzene 2/a; standard range of measurement 2 to 60 ppm benzene

TABLE 4-3

MONITORING EQUIPMENT AND ACTION GUIDELINES
UST Sites
Griffiss AFB, Rome, NY

EQUIPMENT:	COMBUSTIBLE GAS INDICATOR[a] (EXPLOSIMETER)		OXYGEN MONITOR[a][b]		PHOTOIONIZATION METER (PID) AND CHEMICAL-SPECIFIC DETECTOR TUBES[c]			
ACTION GUIDELINES:	Lower Explosive Limit Levels	Action	Oxygen Level	Action	PID Levels (ppm)	Draeger Tube Benzene Levels (ppm)		Action
	0-10%	No explosion hazard	19.5-23.0%	Normal Oxygen Level	<0.5			Modified Level D
	10-25%	Potential explosion hazard; notify Site Manager	>23.0%	Fire/Explosion hazard; Stop tasks, evacuate site; notify Site Manager	0.5			Modified Level D; begin monitoring for benzene every 15 min.
	>25%	Explosive hazard exists; stop tasks; evacuate site; notify Site Manager	<19.5%	Oxygen deficient; Stop tasks, evacuate site; notify Site Manager	0.5-5	and	<0.5 Benz.	Modified Level D; continue monitoring for benzene
					5-125	or	0.5-25 Benz.	Upgrade to Level C; continue monitoring for benzene. (For benzene concentrations >10 ppm; use 5/a Draeger tubes.)
					>125	or	>25 Benz.	Stop work; notify COE regarding need to upgrade to Level B

(a) Monitoring to be conducted at top of borehole
(b) Used in conjunction with combustible gas indicator to confirm combustible gas indicator function
(c) Monitoring to be conducted in breathing zone of worker nearest to borehole; readings for PID and Draeger tubes are referenced to above background levels and reflect those sustained for >5 minutes.

4.6.1 Air Monitoring Equipment and Action Guidelines

The monitoring equipment to be used includes a portable combustible gas indicator, oxygen monitor, photoionization detector (PID), and benzene 0.5/a and 5/a Draeger tubes. The instrument inspection, and calibration logging requirements are described in the RI Planning Documents (Vol. IV, HSP, Section 9.1).

A 10.2 eV lamp will be used in the PID and the span control will be set at 9.8 (benzene equivalent). Action levels for the PID are designed in conjunction with the chemical-specific detector tubes (Draeger tubes) and are based on the lowest TWA of the suspected contaminant (i.e., benzene and toluene). Readings for the Draeger tubes and for the PID are referenced to above background and reflect those sustained for greater than 5 minutes in the breathing zone. If action levels requiring the use of Draeger tubes are reached, Draeger tube monitoring shall be performed every 15 minutes until PID concentrations fall below action levels.

4.6.2 Dust Control

Due to the unknown nature of potential contamination at some of the sites, there is a potential for skin and/or inhalation exposure to dusts that may be contaminated with heavy metals at this site. Therefore, prior to performing field activities in dry, dusty areas at this site, workers will wet down the area of activity with water in order to decrease potential dust inhalation. In the event that this is not possible, personnel must wear Level C protection, including full-face air-purifying respirators with HEPA/dust mist cartridges when intrusive activity produces dusty conditions. The presence of visible dust emissions will be the criterion upon which PPE upgrade or dust suppression measures will be implemented.

4.6.3 Heat and Cold Stress Monitoring

Depending on the season, personnel shall be monitored for heat or cold stress, as described in the RI Planning Documents (Vol. IV, HSP, Section 10.1).

4.7 WORK ZONES

The work area shall be divided into three zones, as described in the RI Planning Documents (Vol. IV, HSP, Section 12.1). The Exclusion Zone, Contamination Reduction Zone, and Support Zone will be specifically designated for sampling areas at this site, as required by OSHA.

4.8 DECONTAMINATION

Personnel involved in activities at this site will follow standard decontamination procedures, as described in the RI Planning Documents (Vol. IV, HSP, Section 13.0).

4.9 EMERGENCY PROCEDURES

Emergency equipment to be provided at the site and emergency procedures to follow are described in the RI Planning Documents (Vol. IV, HSP, Section 15.1).

In the event of injuries or illnesses, personnel will be transported to the Rome Hospital located just west of the Mohawk Gate off-base for treatment. The Rome hospital address is:

Rome Hospital
1500 N. James Street
Rome, New York 13440

Emergency contact phone numbers are presented in the RI Planning Documents (Vol. IV, HSP, Section 15.3). These numbers will be maintained on-site at all times.

4.10 LOGS AND RECORDKEEPING

The following logs and records shall be maintained and updated during field activities:

- Equipment calibration logs
- Daily safety inspection logs
- Employee/visitor register
- Exposure monitoring records
- Accident reports

The information required and frequency of these logs and records are described in the RI Planning Documents (Vol. IV, HSP, Section 16.1) (Law, 1993a).

5.0 ENVIRONMENTAL SAMPLING

This section describes the procedures to be used for sample collection and handling. This section will be implemented only in conjunction with the standard procedures contained in the RI Planning Documents (Volume IIA, QAPP).

5.1 SAMPLE COLLECTION PROCEDURES

The sample collection procedures for the field investigation tasks and the order of sample collection are described in the RI Planning Documents (Volume IIA, QAPP, Section 5.1 and Volume IIB, FSP, Section 12.0, respectively) (Law, 1993a). These standard procedures will be implemented during all sampling activities at the UST sites.

5.2 SAMPLE HANDLING

Samples collected for chemical and geotechnical parameter analyses will be identified and handled at the time of acquisition according to the procedures described below.

5.2.1 Sample Identification - Soil Boring Samples

Soil boring samples will be identified in accordance with the RI Planning Documents (Volume IIA, QAPP, Section 5.3) (Law, 1993a) as follows:

B9SB-1b through B9SB-1n
B44SB-1b through B44SB-1n
123SB-1b through 123SB-1n
137SB-1b through 137SB-1n
214SB-1b through 214SB-1n
255SB-1b through 255SB-1n
305SB-1b through 305SB-1n
802SB-1b through 802SB-1n
814SB-1b through 814SB-1n
830SB-1b through 830SB-1n
858SB-1b through 858SB-1n

631SB-1b through 631SB-1n*	631SB-2b through 631SB-2n
101SB-1b through 101SB-1n	101SB-2b through 101SB-2n
337SB-1b through 337SB-1n	337SB-2b through 337SB-2n
428SB-1b through 428SB-1n	428SB-2b through 428SB-2n
428SB-3b through 428SB-3n	428SB-4n through 428SB-4n
428SB-5b through 428SB-5n	
745SB-1b through 745SB-1n	745SB-2b through 745SB-2n
842SB-1b through 842SB-1n	842SB-2b through 842SB-2n
846SB-1b through 846SB-1n	846SB-2b through 846SB-2n

NOTE: where "n" indicates the sample identification alphabetical code for the "n^{th}" sample depth interval.

* = where 631 represents Tank 6314

5.2.2 Sample Identification - Ground-Water Samples

Ground-water samples from wells installed at Buildings 428, 745 and 846 will be identified as follows:

428MW-1
745MW-1
846MW-1

The samples from the remaining one well to be installed will be specified in accordance with the standard sample identification process at the time of sampling.

5.2.3 Sample Identification - Geotechnical Soil Samples

Geotechnical soil samples from the monitoring well borings from Buildings 428, 745 and 846 will be identified as follows:

745GT-1	846GT-1
745GT-2	846GT-2
428GT-1	
428GT-2	

The QA/QC samples will be identified according to the protocol discussed in the RI Planning Documents (Volume IIA, QAPP, Section 5.3). Section 6.0 of this FOP specifies the QA/QC samples to be collected during this project.

5.3 SAMPLE CUSTODY AND SHIPMENT TO THE LABORATORY

The handling of samples, shipping, and chain-of-custody procedures to be implemented during this project are described in the RI Planning Documents (Volume IIA, QAPP, Section 6.0) (Law, 1993a).

6.0 ANALYTICAL REQUIREMENTS

The following sections present the analytical requirements for field and laboratory parameters and specify the locations and frequencies at which QA/QC samples will be collected during this project.

6.1 FIELD MEASURED ANALYTICAL PARAMETERS

Soil head space screening of borehole soil samples will be performed at the UST sites in accordance with the jar headspace screening method specified in the RI Planning Documents (Volume IIB, FSP, Section 11.1.6). Samples will be collected every two feet from the known or estimated top of the UST to the water table elevation.

6.2 SUMMARY OF ANALYTICAL REQUIREMENTS

Table 6-1 lists the parameters to be tested for each matrix and Table 6-2 lists the analytical methodology to be used for this investigation. Additional information on the analytical methodology, such as quality control requirements, detection limits, and preventative maintenance of the instrumentations used for the analysis, can be found in the RI Planning Documents (Volume IIA, QAPP, Section 7.0).

6.3 QUALITY ASSURANCE SAMPLES

Duplicate soil samples will be collected from the most likely contaminated depth of the soil boring based on the field screening results and the MS/MSD sample set will be collected from the least likely of the contaminated stratum based on the field screening results.

Duplicate ground-water samples will be collected from the well at Building 846 (846MW-1) and the MS/MSD ground-water sample set will be collected from the well at Building 745 (745MW-1).

6.4 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) for measuring data are expressed in terms of precision, accuracy, representativeness, comparability and completeness. The definitions of these terms and project-specific DQOs are addressed in the RI Planning Documents (Volume IIA, QAPP, Section 4.3).

TABLE 6-1

SUMMARY OF FIELD AND QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
UST Site Assessments
Griffiss AFB, Rome, NY

	TCLP (a) VOA + MTBE (b)	TCLP BNA (c)	PCB (d)	TCLP 8 RCRA Metals	Geotechnical Analysis (e)
SOIL BORINGS					
B-9SB-1-	2	2	2	2	0
B44SB-1-	2	2	0	2	0
101SB-1-	2	2	2	2	0
101SB-2-	2	2	2	2	0
123SB-1-	2	2	2	2	0
137SB-1-	2	2	0	2	0
214SB-1-	2	2	2	2	0
255SB-1-	2	2	2	2	0
305SB1-1-	2	2	2	2	0
337SB-1-	2	2	0	2	0
337SB-2-	2	2	0	2	0
428SB-1-	2	2	0	2	0
428SB-2-	2	2	0	2	0
428SB-3-	2	2	0	2	0
428SB-4-	2	2	0	2	0
428SB-5-	2	2	0	2	0
745SB-1-	2	2	0	2	0
745SB-2-	2	2	0	2	0
802SB-1-	2	2	0	2	0
814SB-1-	2	2	0	2	0
830SB-1-	2	2	0	2	0
842SB-1-	2	2	0	2	0
842SB-2-	2	2	0	2	0
846SB-1-	2	2	0	2	0

TABLE 6-1

SUMMARY OF FIELD AND QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
UST Site Assessments
Griffiss AFB, Rome, NY

	TCLP (a) VOA + MTBE (b)	TCLP BNA (c)	PCB (d)	TCLP 8 RCRA Metals	Geotechnical Analysis (e)
846SB-2-	2	2	0	2	0
858SB-1-	2	2	0	2	0
631SB-1-	2	2	0	2	0
631SB-2-	2	2	0	2	0
305SB-1-01	1	1	1	1	0
428SB-1-01	1	1	0	1	0
846SB-1-01	1	1	0	1	0
137SB-1-01	1	1	0	1	0
B44SB-1-01	1	1	0	1	0
745SB-1-01	1	1	0	1	0
B44SB-1-MS	1	1	0	1	0
B44SB-1-MD	1	1	0	1	0
137SB-1-MS	1	1	0	1	0
137SB-1-MD	1	1	0	1	0
255SB-1-MS	1	1	1	1	0
255SB-1-MD	1	1	1	1	0
SPLIT	6	6	6	6	0
GROUND WATER					
745 MW-1	1	1	0	1	0
846 MW-1	1	1	0	1	0
428MW-1	1	1	0	1	0
___MW-1	1	1	0	1	0
846MW-1-01	1	1	0	1	0
745MW-1-MS	1	1	0	1	0
745MW-1-MD	1	1	0	1	0
TB GW-1	1	1	0	1	0

TABLE 6-1

SUMMARY OF FIELD AND QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
UST Site Assessments
Griffiss AFB, Rome, NY

	TCLP (a) VOA + MTBE (b)	TCLP BNA (c)	PCB (d)	TCLP 8 RCRA Metals	Geotechnical Analysis (e)
DW GW-1---	1	1	0	1	0
ER GW-1--R	1	1	0	1	0
SPLIT	1	1	0	1	0
GEOTECHNICAL					
745GT-1	0	0	0	0	1
745GT-2	0	0	0	0	1
846GT-1	0	0	0	0	1
846GT-2	0	0	0	0	1
428GT-1	0	0	0	0	1
428GT-2	0	0	0	0	1
___GT-1	0	0	0	0	1
___GT-2	0	0	0	0	1

NOTES:

(a) TCLP = Toxicity Characteristic Leaching Procedure
(b) VOA = Volatile Organic Analytes
MTBE = Methyl tertiary butyl ether
(c) BNA = Base/Neutral/Acid Extractables
(d) PCB = Polychlorinated biphenyls
(e) Geotechnical analyses include:

Atterberg Limits
Percent Moisture
Grain Size Distribution

(f) One trip blank per day per aqueous VOA shipment will be collected.
(g) Analytical methods for each matrix are presented in Table 6-2
(h) Sample depth intervals will be indicated at the time of sample collection.

TABLE 6-2

ANALYTICAL PARAMETERS & METHODS TO BE USED
UST Site Assessments
Griffiss AFB, Rome, NY

PARAMETER	METHODS	
	SOIL	WATER
TCLP ORGANICS		
Volatiles + MTBE	SW 1311/8021	1311/8021
Semi-Volatiles (BNA)	SW 1311/8270	1311/8270
TCLP 8 RCRA METALS	1311/6000/7000	
Arsenic	1311/7060 GFAA	1311/7060
Barium	1311/6010 ICAP	1311/6010
Cadmium	1311/6010 ICAP	1311/6010
Chromium	1311/6010 ICAP	1311/6010
Lead	1311/7421 GFAA	1311/6010
Mercury	1311/7471 GFAA	1311/7470
Selenium	1311/7740 GFAA	1311/7740
Silver	1311/6010 ICAP	1311/6010
PCBs	SW3550/8080	
GEOTECHNICAL		
Grain Size Distribution	ASTM 421-85 and 422-63	
Atterberg Limits	ASTMD 423 and 242	
Moisture Content	ASTMD 2216-80	

Notes: GFAA = Graphite Furnace Atomic Absorption
ICP = Inductively Coupled Argon Plasma
TCLP = Toxicity Characteristic Leaching Procedure
VOA = Volatile Organic Analytes
BNA = Base/Neutral/Acid Extractables
PCB = Polychlorinated biphenyls
MTBE = Methyl tertiary butyl ether

7.0 REFERENCES

Casey and Reynolds, 1988. Hydrogeology of the Stratified - Drift Aquifers in the Rome area, Oneida County, New York, George D. Casey and Richard J. Reynolds 1988, sheets. Altitude of Water Table.

Code of Federal Regulations (CFR), Title 40, Part 280, Section 72.

Geotech, 1991. Hydrogeology Study Report, 416th Bombardment Wing, 416th Combat Support Group, Griffiss Air Force Base, N.Y. Geotech, January 1991.

Griffiss AFB, 1973. Building 337, Underground Gasoline Storage Tank Placement, Site Plan, Project No. 1335-74-031, Sheet 1 of 3, October 23, 1973.

Griffiss AFB, 1974. Building 428, Airmen's Mess, Heating and Ventilating, Boiler Room Plan and Details. Drawing No. 428-M-1, Dated Last Revision 1-11-1974.

Griffiss AFB, 1987. Replace Leaking Underground Tanks and Remove Contaminated Soil, Project No. JREZ-87-0140 A & B, Drawing Number TD-1855, Feb, 2, 1987.

Griffiss AFB, 1990. Tank Removal # 1, Remove/Replace Tanks. Project Number JREZ-90-0146, Drawing Number TD-2036, June 27, 1990.

Griffiss AFB, 1991b. Base Exchange Gas Station (Building 337) Soil and Ground-Water Analysis, Samples taken October 9, 1991.

Griffiss AFB, 1992. Tank 6314, Real Property Accountable Record Installation, Date and Removal Data of Tank 6314, January 29, 1992.

Griffiss AFB, No Date. Naval Facilities Engineering Command, Northern Division. Renovation to Building No. 44, NAVFAC Drawing No. 20-60089, Sheet 39 of 56.

Griffiss AFB, No Date. Tank Farms # 1, 2, 3, and Salvage Tanks, Refueling and Defueling Lines Bldg. 101, ID # HF-V-4.

Law, 1993a. Draft Final Primary Report, Remedial Investigation Planning Documents, Volumes I, II and IV, Remedial Investigation Work Plan; Health and Safety Plan; Quality Assurance Project Plan; Field Sampling Plan.

Law, 1993b. Data Summary Tables, Draft Final Primary Report, Remedial Investigation Planning Documents, Volume IIA; Quality Assurance Project Plan.

NYSDEC, 1991. Memorandum, Spill Prevention Operations Technology Series (No. 14) (SPOTS), Site Assessments at Bulk Storage Facilities.

NYSDEC, 1992. Memo # 1, Spill Technology and Remediation Series (STARS), Petroleum-Contaminated Soil Guidance Policy. New York State Department of Environmental Conservation.